E Libris Jos. Dawson
1695

A THEATRE OF Politicall Flying-Insects.

WHEREIN

Especially the Nature, the VVorth, the VV-ork, the Wonder, and the manner of Right-ordering of the

BEE,

Is Discovered and Described.

Together with Discourses, Historical, and Observations Physical concerning them.

And in a Second Part are annexed Meditations, and Observations *Theological* and *Moral*, in Three *Centuries* upon that Subject.

By *Samuel Purchas*, Master of Arts, and Pastor at *Sutton* in *Essex*.

Entered according to Order.

LONDON, Printed by *R. I.* for *Thomas Parkhurst*, to be sold at his shop, at the Three Crowns in Cheapside, over against the Great Conduit, 1657.

TO THE
RIGHT HONORABLE,
Truly Noble, and Religious
LORD,
Robert Earle of *Warwick*, Baron of *Leez*, &c.

RIGHT HONORABLE,

THE Creatures are the Book of Nature, as ſaid *Anthony* the Hermite, who being demanded by a Philoſopher, how he could poſſibly ſpend his time in the Wilderneſs, ſeeing hee was deſtitute of Books? anſwered, My Book, O Philoſopher, is the nature of all things crea d by God, which when I pleaſe, I can peruſe and read. The world is Gods Library, God manifeſted and drawn out; and all the creatures are

Socrat. hiſt. Eccleſ. l. 4. c. 18 Nicepho. l. 11. c. 43.

as Glaſſes, in which wee may ſee; and as Scaffolds and Ladders, by which we may aſcend and draw nearer to him: For God is a light too ſtrong for our ſenſe, therefore we muſt (with him in the ſtory) look for the Sun in the Weſt, not in the Eaſt; behold the Lord as he is reflected, and refracted, firſt in the glaſs of his Creatures, and his Works: And then ſecondly, in the face of his deareſt Son.

God in the School of Nature, uſeth a method ſo ſuitable and correſpondent to our dulneſs, that our meditations ſhould not want in the Creatures Volumes (I may ſay) wherein to read moſt excellent admonitions and inſtructions: In every creature are they engraven in ordinary characters, and in leſſer a print; as in the Scriptures, they be written in capital letters once, the Creatures are as a bright glaſs, wherein we may behold our God; For as God is a glaſs in heaven, wherein all his creatures are ſeen, ſo are the creatures a glaſs upon earth, wherein we may behold and know our God. They are Trumpets of his honour, witneſſes of his worth, bellows

Sir John Hayward, Davids Tears.

lows of our love, ſpurs to our dulneſs, and judges of our unthankfulneſs.

There is ſome good in all creatures, the meaneſt hath a beam of Gods Majeſty, yet ſome have more than others, the Bees more than (almoſt) any. That a little neglected creature ſhould bee ſo curious in Architecture, and in the fabrick of her hexangle Combs ſhould obſerve as juſt proportions as the beſt Geometrician, we ſhould ſuſpect for an untruth, if wee ſaw it not daily practiſed by them. Oſwald Crollii baſilica chimica.

Nicoſtratus in *Aelian*, finding a curious peece of work, and being wondred at by one, and asked what pleaſure he could take to ſtand as he did ſtill gazing on the Picture? anſwered, Hadſt thou mine eyes, my friend, thou wouldſt not wonder, but rather bee raviſhed as I am, at the inimitable art of this rare and admirable peece. I am ſure no Picture can expreſs ſo much wonder and excellency as the ſmalleſt Inſect: But wee want *Nicoſtratus* his eyes to behold them.

And the praiſe of Gods Wiſdome and Power, lies aſleep and dead in every crea- Raymundus in Theologia naturali,

ture, untill man actuate and enliven it. I cannot therefore altogether conceive it unworthy of the greateſt mortals to contemplate the miracles of Nature, and that as they are more viſible in the ſmalleſt, and almoſt contemptible creatures, for there moſt lively doe they expreſs the infinite Power and Wiſdome of the great Creator, and erect and draw the mindes of the moſt intelligent to the firſt and prime cauſe of all things, teaching them as the power, ſo the preſence of the Deity in the ſmalleſt Inſects.

What ſhould bee preſented to great men, but great and goodly gifts? In this perhaps many will comply with mee, but then readily deny, that a Diſcourſe of Inſects is to bee offered to your Honour; but I eaſily trample on ſuch exceptions, for although the creatures herein handled, bee ſo ſmall that they cannot fully bee known, and (as worthleſs, and uſeleſs) bee undervalued by many, yet by judicious wiſe men, who meaſure things not by greatneſs, but by goodneſs, they will not only be prized, but praiſed; not only magnified,

fied, but admired. In all parts of natural Philoſophy, the knowledge whereof is moſt difficult; the contemplation laborious, and the nature moſt obſcure. I have (ſaith *Aldrovandus*) found that moſt difficult which is converſant about Inſects, and that for their notable, and admirable ſmalneſs, which is the reaſon (ſaith he) that no man as far as I know, hath delivered many memorable things of them: Only *Ariſtotle* of the *Grecians* have diſcovered ſome things worthy to bee known; and *Pliny* of the *Latines* ſomewhat more, which he collected from the Monuments of *Greek* and *Latine* Writers (which are now loſt) and ſome few things beſides there are, which later Writers have taken notice of, but all ſo lame and imperfect, that ſtill much remains to be added and amended; and ſo brief and obſcure, that many ſtill are ignorant and deceived. Aldrovand. ad Lector.

Scaliger is very angry with *Cardane*, that after *Ariſtotle* he ſhould write of Bees, and add nothing new, nor true: Whereas learned *Scaliger* endeavouring to confute him, is guilty of many abſurdities, I cannot Scalig. de ſubtil. exercit. 181.

not but expect to hear the ſame reproach from ſome, whom I only requeſt judiciouſly to read, and then to cenſure.

Lipſii Præfat. ad I. Saturnal.

Embroiderers, of threds of divers colours (in the new world of various feathers) make a coſtly and delightful Hanging: So VVriters out of a thouſand parcels, an uniform, and agreeing body; whom I have laboured to imitate, where I have failed, pardon my weakneſs, and accept my good will.

But my long Epiſtle is injurious to your Honours more neceſſary employments. *The Lord preſerve your Honours perſon, with your Honourable Conſort, and all the Noble Branches deſcended from you.*

Your Honors humble
and lowly Orator,

Samuel Purchas.

THE

THE CONTENTS OF THE Several CHAPTERS.

Chap. 1. *Of the Excellency of Bees*	Page 1.
Chap. 2. *Of the Name*	p. 2
Chap. 3. *The Definition and Deſcription*	p. 3
Chap. 4. *Of the Kindes and Colours*	p. 8
Chap. 5. *Bees nature and properties*	p. 11
Chap. 6. *Bees Politicks, Ethicks, &c.*	p. 16
Chap. 7. *Of the Bees ſenſes*	p. 22
Chap. 8. *Of the Queen-Bee*	p. 27
Chap. 9. *Of the Drone*	p. 35
Chap. 10. *Of the Generation of Bees*	p. 42
Chap. 11. *Of the Hives, and ordering them*	p. 57
Chap. 12. *Of Seats for the Hives, and Bee-Garden*	p. 61
Chap. 13. *Of the Bees-work*	p. 67
Chap. 14. *Of ſwarming, and hiving of Bees*	p. 77
Chap. 15. *What Flowers the Bees gather of*	p. 92
Chap. 16. *Of the ordering of Bees*	p. 96
Chap. 17. *Of Bees breathing*	p. 107
Chap. 18. *Of Bees temperature, ſleep, and age*	p. 108
Chap. 19. *Of Bees Fighting and Robbing*	p. 111
Chap. 20. *Of Bees Enemies and Sickneſſes*	p. 116
Chap. 21. *Of the Hony-dew*	p. 123
Chap. 22. *Of Hony*	p. 135

The Contents.

Chap.23. *Of Tree-hony* p.147
Chap.24. *Of Waxe* p.157
Chap.25. *Obſervations and diſcourſes Hiſtorical and Fabulous* p.161
Chap.26. *Obſervations, Phyſical, &c.* p.169
Chap. 27. *Of divers kindes of Wild-Bees* p.179
Chap. 28. *Of the Waſp* p.181
Chap.29. *Of the Hornet* p.186
Chap. 30. *Of Humble-Bees* p.188
Chap.31. *Of Graſhoppers* p.193
Chap.32. *Of American Bees* p.202

A Catalogue of ſuch Authors as are cited, and made uſe of in this Tractate.

A

MR. R. Abbot
Abynzoar
J. Acoſta
Actuarius
Ælian
Æſope
Mr. Adams
Agatharſis
Raimund de Agiles
Cor. Agrippa
Albertus
A. Alcynt
Uliſſes Aldrovandus
F. Alvarez
Alex. ab Alexand.
Ambroſe
Andernacus
Amyretus
Jo. Anglicus
Appian
Alex. Aphrodiſſ.
Hier. Fab. *ab Aquapendente*
Aquinas
Ariſtophanes
Ariſtoteles
Athanaſius
Atheneus
Auguſtinus
Avicenna
Auſonius

B

Dr. Balcanqual
Hermolaus Barbarus
Baronius
Barrudas
Broughton
Baſil
A. Battle
Bauhinus
Gorop. Becanus
Beda
A. Bellunenſis
Pet. Bellonius
Bernardus
Pſeudo-Beroſus
Bodinus
Bonfinius
Mr. Bolton
Gio. Botero
Mr. Brathwayt
Geor. Brawn
Mr. Butler
Buxtorfius

C

Cajus
Aloyſ. Cadomuſtus
Cæl. Calcagninus
Calepine
Calvinus

Camden
Camerarius
Al. Campenſe
T. Cantipratanus
Julius Capitolinus
Cardanus
Georg. Cedrenus
Cor. Celſus
Ranulph Ceſtrenſis
Chaucer
Chriſoſtomus
Chytræus
Cicero
Ped. de Cieca
Claudian
Dr. Cleland
Mr. Cobbs
Columella
Natal. Comes
Val. Cordus
Fernand. Corteſe
Mr. J. Botton
P. Botton
Mr. Cowper Biſhop
Elias Cretenſis
Pet. Creſcentienſis
Pet. Crinitus
Crollius
Ælius Jul. Crotta
Cæl. Auguſt. Curio
Q Curtius
Cuſpinianus
Cyprian

D

Dalechampius
Dr. Day
Diodorus
D. Dike
Dion
Dioſcordes
Mr. Down

E

Jacob Ekcelius
Mr. Elton
Marcel. Empyricus
Epiphanius
Erotis
Eſtates of the world
Euripides
Euſtathius
Eutropius

F

Fazelius
Dr. Featly
Fernelius
Fran. Fernandus
Marſil Ficinus
G. Fletcher
Florentinus
Mr. Fosbroke
Franzius
Otho. Friſingenſis
Fuchſius
Mr. Fuller
J. Fungerus

G

Galenus
Mr. Garey
Mr. Gataker
Theod. Gaza
Cor. Gemma
Geminianus
Gilpine
Hier. Girova

Rob. Gloceſtrenſis
Godignus
Godwin
Mr. T. Goodwin
Ber. Gomeſius Miedis
Mr. Googe
Gregorius magn.
Gregorius Nazian.
Mr. R. Greenham
Hil. Greg. Gyrald.
J. Ja. Gryneus
Gualther
Ant. Guevara
Guild

H

Hackluit
Dr. Hakewill
Dr. Hall
Mr. Harris
Mr. Hartlib
Dr. Harvey
H. Hawkes
J. de la Haye
Sir Jo. Hayward
Helmont
Mr. Herbert
Herodian
Herodotus
Ant. de Herrera
Heſychius
Heſiod
Hieronimus
Higinius
Hilarius
Mr. Hill
Pet. Hiſpanus
Hippocrates
Mr. Hoard
Mr. Holbroke
Hollerius
Dr. Holland
Homer
Horatius
Job Hortop
Hugo Cardinal.

I

Mr. T. Jacombe
Dr. James
Jarricius
Dr. Jeniſon
Joſephus Indicus
C. Jobſon
Dr. Jones
Mr. Johnſtone
Joſephus
Jovius
Iſocrates
Iſidorus { *Hiſpalenſis.* / *Peluſiot.*
Silius Italicus
Juſtine
Juvenal

K

Dr. Kilbie
Kimchie
Dr. H. King
Dr. J. King
Krantzius

L

Lactantius
Dr. Lake
Jo. Langius
Mr. Lawſon

Levin. Lemnius
Ambr Leo
Jo. Leo
Nicol. Leonicus
Lerius
Mr. Levit
And. Libanius
Linſchoten
Lipſius
T. Livie
Matth. de Lobel
Mr. Lockyer
Lucian
Lucretius

M

Mocrobius
Magirus
J. Magnus
Olaus Magnus
Majolus
Bapt. Mantuan.
Martial } *Epiſcop.* *Poeta.*
Matth. Martinius
Marullus
Matthiolus
Pet. Matthew
Mr. May
Menoſa
Hier. Mercurialis
Mr. Merideth
Meſue
Ped. de Mexia
Mr. Milles
Jo. Miletius
Mizaldus
Rhodol Modius
Moryſon
Mouffetus

N

Nicander
Nicephorus
Nicetas
Nigidius
Niphus
Joach. Nizæus

O

Julius Obſequens
Oneſicritus
Paulus Oroſius
Adamant. Origines
Ortelius
Oſorius
Ovidius
Oviedo

P

Dr. Page, Sanct. Pagninus
Palladius
Guid. Pannyrollus
Paracelſus
Pauſanias
Pennius
Perottus
F. Picolomineus
Phavorinus
Philo
J. Picus, E. of Miran.
Pigafetta
Pineda
Geor. Piſcatorius
Guil. Plantius
Dr. Playfere
Plautus
Pliny
Plutarch

Polanus
Polybius
Porcacchi
Dr. Preſton
Dr. Prideaux
Dr. Primroſe
Mr. Purchas

R

Mr. Randal
Raymundus
Mr. Remnant
Mr. Reyner
Mr. Reynolds
Ramuſio
Beat. Rhenanus
Ribera
Matth. Ricius
Rivetus
Cæl. Rhodiginus
Mr. Roberts
Mr. Rollenſon
Hier. Romano
Roſinus
Mr. Rowlandſon
Hieron. Rubeus

S

M. A. Coc. Sabellicus
Salmeron
Hen. Salmouth
Salvian
Sands
Mr. Sanderſon
P. Sanflorus
Joaon dos Santos
Jo. Sarisberienſis
J. Cæſ. Scaliger
Dr. Sclater
T. Scot
Scribonius Largus
Selden
Seneca
Servius
Dr. Sibs
J. Silveſter
Huldrichus Smidel
Socrates
Solinus
Sophocles
Mr. Southern
Spanhemus
Spencer
J. Stobæus
Mr. Stock
Dr. Stoughton
Strabo
Valfridus Strabus
Mr. Struther
Stuckius
Mr. J. Stanes
F. Stancarus
Sylvaticus
F. Suarez
Suidas
Mr. Swift
Mr. Sym

T

C. Tacitus
Tarnovius
Dr. Jer. Taylor
T. Taylor
Tertullian
J. Ra. Textor
Theocritus
Theodoret
Theophilact
Theophraſtus
Ped. Teixeira

A. Thevet
Mich. Toxites
Maximil. Tranſilvanus
A. Turnebus
Geor. Turonenſis
Willer. Tyrenſis Arch.
Tzetzes

V

Valerius Maximus
F. Valeſius
Valleriola
Varro
Garſi laſſo de la Vega
L. Verulam
Vigerius
Vincentius
Virgil
Polyd. Virgil
Vitichindus
Fulvius Urſinus
Dr. Uſher

W

Dr. Wall
Dr. S. Ward
M. Watſon
Weckerus
Dr. Williams
Jod Willichius

X

Xenophon

Z

Zanchy

TO THE
Author upon his Phyſio-theological Hiſtory of *BEES*.

WHence this brave flame? and to what ſacred fire
(Divine *Prometheus*!) do thy thoughts aſpire?
Myſterious Nature takes it ill, to be
Dethron'd from her retired Majeſty:
Thy daring hand hath taken off her dreſs,
And ſhew'd her naked, mid'ſt her hid receſs:
Thou haſt broke up her Archives, and haſt ſet
To ſale, her Jewel, and her Cabinet:
Her Iliad in her Nut; and now thy Bee
Is not her work, but her Anatomy,
Which thou haſt handled too, at ſuch a rate,
That 'twere but one ſtep higher to create;
Thou haſt her Miracle ſo here made known
'Twas ner'e hers once, more, then 'tis now thine own;
Hers at the beſt was natural, but thine
Is through thy learned labour made divine;
Paradiſe is her flowry Garden, whence
Shee ſucks Elixir all, and Quinteſſence,
This ſacred ſympathy wee ner'e did know
Till thy high ſoaring ſearch had found it ſo:
That which wee all have yet admir'd was but
The ſhell, thou only feaſtedſt on the Nut;
Whilſt towring far above our common ſenſe
Thou takeſt heaven by thy violence;
And with thy ſoul on wing, invad'ſt the ſky,
Bringing us Angels Manna from on high
In pious raptures, thus this work of thine
Gives us another table Smaragdine;

Above and Here are like the Gordian Twiſt
Is thus unravel'd by our Triſmegiſt:
Now Heaven and Earth in one comb'd we ſee,
And God and Nature center'd in a *BEE*;
This wee muſt owe to thee, thy learn'd ſweat
Bankrupts, and leaves us dying in thy debt:
Pardon mee then if unto thee I do
Aſſert the keyes of Earth and Heaven too:
Gather our Bees! and hiv'd from Envies harm,
Thrive may thoſe ſtocks from whence theſe Graces ſwarm.

N. T.

Upon the Authors Elaborate Treatiſe of *BEES.*

BRokers in verſe condemn it as a crime
To preface Treatiſe with a ragged rime.
Oh this doth ſtrike mee dumb! and bids mee look,
I draw no Curtain to eclipſe thy Book:
No, if my Lackey-muſe ſets out, poor ſhee
Runs but to raiſe up eyes to gaze on thee:
Let others ſound thy worth in ſilver mettle
Whilſt to thy Bees I rang a jarring Kettle.
My Muſe had kept at home, but that ſhe ſees
Even Drones themſelves indulg'd amongſt thy Bees:
I've ſometimes view'd thy ſmall Volaticks flye,
Like golden atom's hov'ring in the sky;
And then deſcending gently one by one,
Like curled locks diſhev'ld from the Sun,

This

This obiect pleas'd mee well, but when I ſpy
By wings of fancy poys'd with gravity:
Thy thoughts to ſoar a higher pitch, why then
My mind's unpleas'd, but better pleas'd again:
I've peep'd into thy Hive, thy Book, and I
Finde Bees t'have leſs of art and induſtry;
And ſweetneſs too, and ſo muſt needs confeſs
I long to taſte thy hony from the preſs.
Each page a comb, each word's a bell from whence
Melliſluous dew's diſtill in eloquence.
Were I to lead thy troops, hither I'de flye
On every leaf to prove their Chymiſtry.
Here tyr'd and weary thoughts may ſweetneſs ſcan,
And re-aſſume new life with *Jonathan*.
Thy obſervation's quick, what thou haſt writ
Speaks thee Dame Natures chiefeſt favourite.
The thoughts of various Authors thou haſt ſhewn,
And prov'd them flye-blown fancies of their own:
Thou knoweſt each Bee, their flight, and tracts their ſtage,
And ſo haſt wrote a ſecond Pilgrimage.

One hony'd ore a Tyrants eye to feaſt
Did run the Gantlope through a Hornets neaſt.
Waſp-like, who at thy Book exceptions take
Makes thee a Martyr for thy ſweetneſs ſake.

Jo. Angier.

Ad venerabilem Apiarium Authorem, Mr. *Sam. Purchas* Miniſtrum, de Poly-hiſtorico ſuo Mellificio; nec non lectorem candidum, carmen Anagrammaticum.

Samuel Percas } Nomen
Mel, curas apes } Anagram.

MEl curas & apes, mage cves has diligis illos
Nec fugis, aut ullo negligis ipſe modo.
Sancta Theologiæ pandit myſteria docte
Sic tua conſcribit ſuada Philo-logia
Rectorem & hiſtoricum libro nunc aſpice docto
Ecce Miniſter ovum, atque ecce Magiſter apum.

Ja. Norricius.

To the Reader upon the Philo-logical and Theo-ſophical Treatiſe of BEES.

WHat *Ariſtotle*, *Pliny*, wrote before,
Virgil, *Alarcvana*, *Scaliger*, *Butler* more;
In this one book ſee thou mayeſt more than any,
And marvell not if that I do ſay many.
All that have written of theſe Inſects nature
So much, which very little are in ſtature.
I do not know whether for mine own part

Bees

Bees nature moſt, t'admire, or Maſters art;
Who centuries hath perus'd, his eloquence
Beſides experience, mark t'hiſtory,
Philoſophy, ith' Treatiſe, Theol'gy,
You may call't an Encuclopedy, all
For tongues, arts, matter, pos'tive polem'cal;
A Bee-hive for thy life, moſt full of hony
Purchaſe then this *Purcaſan* work, thy mony:
'Twill far excell, exceed to thee as gainfull,
As 'twas though pleaſant, to the Writer painfull:
For a ſubject ſo good you cann'c leſs give,
Give then good words, and praiſe it while you live:
Or elſe amend, chooſing, or to do better,
Or to deſiſt from the cenſorious letter:
There's hony in his name, more in his book,
Which is mellifluous, come taſte as look;
Make this Anthology Pantol'gy thine
Ambroſian *Purchas* Nectar Divine.
I wonder not it is ſo natural
For thee to be 'bout Bees hiſtorical.
This Treatiſe framed with ſuch artifice
Shews ſome paternal metemſychoſis:
Though ſome Antilogiſts ſhall vilifie
The Work, Work-man, both have my Eulogy.

θητὰ
Critical, the letter of condemnation, Beeman. See the Latine Anagram.

To Zoilus.

Can *Mimus* do the like, will *Momus* like
This Polanthean Pantologick book?
With tongue or pen do not perſtringe or ſtrike,
I'le not be Mome, nor Mime, to be I look
While Bees ſhall be, and ſhall their Hony give
This Bee-maſters name, fame, when dead ſhall live.

Ja. Norrice Paſtor of *Cavendun.*

Upon the Authors Learned and Elaborate Treatiſe of *BEES* in both parts of it, an Encomiaſtick.

READer, read here a book of *BEES* diſſected,
Their nature, ſtature, feature, parts detected;
Their feeding, breeding, building, induſtry,
Their prudence, providence, ſagacity,
Their peace, their war, their love, their mortal hate,
Their Prince their Leaders, order in their ſtate;
All theſe and more unfolded in ſuch wiſe,
That it a Hive of glaſs, thou mayeſt ſurmiſe.

Then magnifie this little Creatures Maker,
That (it) of ſuch endowments made partaker;
Wherein his Wiſdome, and his power Divine
(As in the heavens above) do clearly ſhine
In text hand-writing; what thou there doſt ſee,
In ſmaller letters here imprinted *Bee*.
Next praiſe the Authors *Bee-like* diligence,
His reading, learning, long experience.

On the ſecond part. Eccleſiaſt. 12. 10.

And then read on to that which follows next,
The Preachers Sermon on this pretty Text,
Doctrine diſtilling like the Hony-dew,
Melliſluous, moſt pleaſant, upright, true.
O gather then the Hony from theſe leaves,
Thoſe vices flye to which thy nature cleaves.
And learn thoſe vertues which the Bees do teach
Thine underſtanding, elſe this book don't reach.

By his loving Friend and Neighbour,
T. P. *Maſter of Arts,* P. P.

Ad

Ad doctum Authorem, in Mellifluam ipſius de Apibus hiſtoriam carmen, ἐγκωμιαστικὸν.

Floribus eximiis mel Apes producere luſtrant
Sic (Purchas) *libris roſcida mella legis.*
Quæ veteres ſcripſere diu, teſtibus æquis
Arte probas; Laudem dulce loquatur opus
Tractatus doctus, permiſcens utile dulci;
Stillans delicias Religione liber.
Hic labor, hoc opus eſt, Apibus medicina ſalubris
Conditur, ac medicam porrigis arte manum.
Myſtica naturæ narras, amor urget habendi
Nectar Apis? placida diſcutis hiſtoria.
Gratulor ingenium, librum dum mente revolvo,
Mel ſapio ſcriptis cum pietate novum.

Guil. Rogers *A. M.*

Upon the Authors Treatiſe of BEES.

WHat Creature iſt' that God hath made?
But emblems forth ſome ſignal ſhade
Of that divine and higheſt power,
Who makes unmakes, all in an hour,
The ſea is fill'd with ſmall and great,
The earth as full, and moſt compleat,
The glorious heaven beyond compare,
That place where Saints and Angels are:
The baſeſt worm, who eats but duſt,
Speaks glorious praiſe, and that moſt juſt;

Unto

Unto that God who made us all
In his own way; myſterial.
The eye of man is over dim
To ſee the glory that's in him:
His hinder parts wee may behold
Which hee in Nature doth unfold.
Here is the *Bee*, a creature ſmall
Which *Sans*, the reſt, may teach us all
His pains, who hath this *Bee* expreſt,
Shews whether *Bee* or *Drone* be beſt;
Who reads this work ſhall therein finde
A skilful pen, an honeſt minde.
Peruſe it well, and thou ſhalt ſee
More Hony here than in the *Bee*.

Jo. Leane Miniſter of *Little Stambridge*.

In Meliſſologiam a viro omnifariam docto Domino Purchaſo Elogium.

Plurima mandantur chartis de Apibus Monimenta,
Parvi at momenti; plæraque fictitiis
A: patratitiis vanis ſunt ſcriptare ferta,
Mundus vult falli credulus & fatuus
Falſum pro vero torpenti Comate preſſus
Devorat, (bine ſophiæ maximus ille labor
Negligitur) ſatis eſſe putans in verba Magiſtri
Jurare, indubium quicquid id ipſus ait
Amplectens: Genio arridet fallacia dulcis
Quoique fovet pigrum ſemper erit placidum.
Sed latet in putei veneranda ſcientia fundo
Antlare ac debet continuo rigidus

Qui

Qui ſtudet optatum tandem comprendere Aleptum
Ille nucem frangat qui valet & nucleum.
Hoc iter ad verum, quo tu mi Purchaſe docte
Tendebas, credens nobilius ſapere
Ex rebus quam libris, mox commercia agebas
Parvis cum Inſectis in quibus ipſe Deus
Emicat illuſtris, quorum Idioma tenebas.
(Qui Polyglotſſus eras) ingenio facili.
Numinis hac tibi pandebant Magnalia ſummi
Atque loquebantur ſcibile quicquid erat
De eſſe ſuo, abſque mora tu Pyramidalia tecta
Ingrediens luſtras Dædalea illa opera
De coitu, Geneſi, partu, paſtuque ſtupendo
Horum quid regimen, quæ Politeia manet
Illis contemplatis, quæ ad civilia bella
Spectant, ad pacem quomodo ſint reduces,
Ambroſium ſuccum quis ſit modus eliciendi
Stirpibus e variis arte ſua Chymica.
Inſuper his de parvis mille Arcana recludis
Mellificis, penitus quæ latuere alios.
Quocirca tibi qui debetur honore rependet
Quicunque ingenuus, proferet & merito
Cunctis hac in re palmam preripuiſſe.
Plus & Apes viles inſtituiſſe ſuum
Impigrum Dominum de Diis, morum probitate
Oeconomi cura, regis & officio
Quæ ſpectant populum quam immenſa volumina quorum
Lector in hoc ſolo nititur ἄυλῳ ἐφῃ.

G. T.

To the Learned Author of this *Bee-like* laborious Treatise.

WHat shall I praise the Author or his pen,
Or run division 'twixt them both? oh then
My Muse would tire, his name needs not my layes
His fathers Pilgrimage earth ware the bayes;
I then will sing the praise of Monarchy
In female sex whose curious industry;
Just rule, sweet concord and frugality;
Mortals amaze, when into it they pry.
But learned *Purchas* spight of spears is bold
Their Castle to assault, and doth unfold
Their nature, kindes, products, and curious works;
Their valour, order, wealth, and what ere lurks
Within the concaves of their golden wall
He hath spied out, and doth impart to all
Much worth's in least of things I now believe
The busie *Bee* hath taught me from her Hive.
Sith Natures Ark's broke ope, come all and view,
Mysterious arts, secrets both old and new.
But herein doth excell his proved skill
Surpassing far the rudeness of my quill.
Grave meditations both Moral and Divine,
He hath extracted from dark Natures mine;
Much labour hath procured this precious oar,
And gathered hony sweet such'd from each flower:
And thus by imitation truly wise
He doth not scorn to learn of puny flyes,
Thank then the Author, admire the little *Bee*,
But give the God of Wisdome praises free,
Muse now be silent, let himself relate
The rare news he hath brought from *Scithian* state.

Jo. Fisher.

ERRATA.

PAge 9. l. 6. blot out I in Scaliger, p. 10. l. 3 blot out not, p. ib. l. 14. r. about the Cape de brun Speranza, ſo black, yet both under the ſame Tropique, why the Abyſſines are but Tawny Moores; when as, &c. p. ib. l. 16 r. are very black; p. 12 l. 38 r. quieſcent, p. 15. l. 22. r. Aldrovandus, p. 30. l. 34. r. out of, p. 30. in marg. r. Pod. de Mexia, p. 35. l. 17 r. waſters, p. 42. l. 1. for may r nay. p. 44, l. 31. r. Ariſtotle: p. 45. l. 5. r. ſit: p. 46. l. 37. r. mark: p. 47. l. 28. r. analogous: p. 49. l. 37. for none, r. any: p. 51. l. 22. for for, r. from: p. 52. l. 6. r. excrements: p. 75. l. 20 r. *ſiculæ*: p. 75. l. 21. r. Hymetti; p. 75 in marg. r. Maiopotmos; p. 97. l. 5. r. Mouſe; p. 99. l. 16. blot out then; p. 101 l. 19. r. puts; p. ib. l. 24. r. upon the empty hive; p. 104. in marg. r. Fazellus; p. 110. l. 34. r. tattered; p. 115. l. 16. r. ſecond; p. 119. in marg. r. Joaon dos, &c. p. 122. l. 4. for after, r. often; p. 128. l. 10. blot out their; p. 130. l. 14. r. Pancyrollus, p. 131. l. 4. blot out of; p. ib. in mar. r. Pancyrollus; p. 133. l. 20 blot out dew; p. 138. l. 32. blot out alcribes; p. 144. l. 10. ſhould have been placed p. 143. l. 35; p. 157. l. 18. r. Hollerius; p. ib. l. 35. r. Gaza, p. 160. l. 34. blot out which; p. ib. l. 35 r. on the other ſide; p. 163. l. 10. r. Hermonax; p. 164. in marg. r. Tit. Livius; p. 165. l. 8. r. Olynthia; p. 173 l. 7. for one ounce of; r. out of; p. 179. l. 29. r. tranſverſe; p. 185 l. 32. r. once, p. 190. l. 1. blot out if; p. ib. l. 20. r. continue; p. 195. l. 27 r. ruſſet; p. ib. l. 36. r. yet within all, &c. p. 201. l. 5. r. once; l. 16. r. Diaconus.

ERRATA in the Second part.

Page 258. in marg. r. D. Dike; p. 262. l. 21. r. return; p. 267. l. 21. r. maketh them conſiſtent; p. 310. l. 14. r. ſtubborn; p. 311. l. 5 r. make; p. 318. l. ult. r. ſpat; p. 325 l. 20. r. wrought; p. 348. l. 32. r. reine; l. 33. r. Bees; p. 364. l. 15. for tangle, r. taile; p. 370. laſt line, for Drones r. Doves. p. 374. l. 6 r. Plaucus; l. 24. r. in Pitchers; l. 26. r. advantage; p. 376. l. 17. r. admit; l. 28 for were, r. are; p. 381. l. 12. for to, r. To; p. 382. l. 2. r. *quæſtum*; p. 386. l. 27. r. which is; p. 387. l. 9. r. laſt.

A Theatre of Political Flying Insects.

CHAP. I.

The Excellency of Bees.

BEes are the most excellent of all Insects whatsoever, and expresse both worth and wonder in all their waies: They only afford delightful food, and pleasant nourishment for man, whereas the best in other kindes serve only for Physick, or the pleasure of the eye, or the delight of the ear, or the cloathing of the body: the most part whereof is by these also some way or other abundantly supplyed; so that natures power is no lesse in Bees, than in the greatest, and most perfect creatures; for hee that made the Camel, and the Elephant, made the Bee too. This is somewhat, but yet not enough; because they are the most excellent Creatures for Prudence, and profit, except man; and indeed the divine wisdome hath thus ordered it, that wee might understand that Prudence consists not in the greatnesse of the body, but in the minde, which hath no need of magnitude, but as it is lesse, is so much the more excellent. Here is *magnum in parvo*, a little in quantity, but much in worth and quality.

Jo. Rainf. Text. Epithet. Dr. Jones Comment in Epist. ad Philem. Carden. l. 7. de Varietat. rerum.

The Bee is a little creature, but Gods smallest springs prove at length main Oceans, his least beginnings grow into great works, great wonders.

Who can imagine that so many pleights and joints, con-

nexions, and concatenations, ſhould bee orderly diſpoſed in ſo ſmall a fabrick? That in a body ſo little, the joints ſhould move ſo actively, the wings ſtirre ſo nimbly, the ſting penetrate ſo deeply, the ſenſes utter forth themſelves ſo ſharply, Nay, the lungs, (though ſcarcely viſible) to breath ſo powerfully, doth any then glory, or is proud for his skill in various arts! What in this reſpect is wiſer, or better inſtructed than the Bee? What Artificer is ſo various, what Painter, what Geometrician can imitate her works?

Chryſoſt. Comment in Epiſt. Pauli ad Philip. c. 2. v. 4.

Why do wee then marvail at the Tower-bearing ſhoulders of Elephants, and not rather where Nature hath planted ſo many ſenſes, and ſuch induſtry in ſuch little bodies? where is hearing, ſeeing, ſmelling, taſting, and feeling, yea where are the Veines and Arteries in theſe ſo little bodies, which a little diſtance from us can ſcarcely bee ſeen with our eyes: And what ſhall wee ſay of the parts of the ſame? and yet in this little Bee is ſuch ſagacity and induſtry, as the like is not ſeen in creatures of greater quantity.

Pliny ſaith, no creature can live or move without them.

The great Artifex of Nature hath enlarged the ſmaller creatures with wiſdome, and invention, ſo teaching that greatneſſe is to bee found in meanneſſe (as the Apoſtle ſaith) ſtrength in infirmities. Imitate if thou canſt the Bees buildings, the Ants hills, or lodgings, the Spiders nets, the Silk-worms webbs.

Tertul. adverſus Marcion. lib. 1.

Such therefore are not a little miſtaken, who affirm that there is neither much ſtrength, nor yet ſuch beauty in ſmall creatures, as in the greater; nay, that whereas the greater, as the Elephant, and Horſe are profitable, the leſſer ſerve only to offend, whereas what Creature for profit can compare to the Bee, or the Silk-worm?

Ant. of Guevara famil. Epiſt.

And though the greateſt thing the Vulgar praiſe her for, is her laborious induſtry, yet indeed the leaſt thing that may bee praiſed in her, is her induſtry.

For, If old times admire Calicrates
For Ivory Emmets, and Mermecides
For framing of a rigged Ship *ſo ſmall,*
That with her wings a Bee can hide it all.
Admire wee then th'all wiſe omnipotence,
Which doth within ſo narrow ſpace diſpence
So ſtiffe a ſting, ſo ſtout and valiant heart,

Du. Bartas 6th day.

So

So loud a voice, so prudent wit, and art:
Their well rul'd state, my soul so much admires
That durst I lose the reigns of my desires,
I gladly could digresse from my design,
To sing a while their sacred discipline.

CHAP. II.

Of the Name.

IN *Hebrew* a Bee is called, דְּבוֹרָה *Debora*, from the order of their work, which they frame with admirable art and industry; Among the *Greeks*, Bees had various names, according to the variety of Nations, and Countries, but the most Vulgar was, μέλισσα (and *Hesiod* hath μελίσσα παρὰ το μέλι, from Hony, whereof the Bee is the Chymical preparer) and they are also called, μελιτῖαι ἀ μελετῶ, because no Insect is so profitably industrious. The *Latins* call them *Apis* and *Apes*, because as *Virgil*, they are *trunca pedum primo*, first bred without feet: And indeed the Worm or Potential Bee, called by the *Greeks* ἄπαδον, *Scbadon* is without leggs, but after her Metamorphosis (of which afterwards) shee comes forth a six-legged creature, but because this Etymology answers not Analogy, as other compounds, it is supposed by others to bee a simple word: So also *Servius* and *Pyr. Perottus* in *Cornucop.* *Lucian* therefore calls them, ζῶα ἄποδα, A. *Canlep. in dictionar.*

The word Bee, according to *Goropius*, is originally Dutch, and therefore English; and so composed (saith hee) because it affords us many things: Wax, for curing of dolours, wounds, Ulcers; for lights, Ceare-cloath, and many other things; and for Hony it would require a daies work to declare the benefit and worth thereof. And though these bee great benefits, yet there are more excellent and remarkable to bee observed from this Creature: For every Common-wealth, every Kingdome receive their best directions and precepts, whereby the duties of the King towards the people, and of the people towards the King, and of the Citizens among themselves are

Gorop. Becan. Hermath. lib 6

moſt clearly taught. If they hold forth any patterns to us, wee readily write after them, and practiſe them. For it ſignifies alſo, ſaith hee, to command or rule, becauſe it is the ſame ſupream Majeſty, that affords and beſtows all things, and commands all things. Wherefore the Architect of words by a ſingular prudence hath commended to us Monarchy, included in certain limits by the name of Bee; which ſtate whoſoever attains, it is neceſſary that hee imitate the King of Bees, who ſo deports and carries himſelf, that hee is beloved, provided for, and protected by all the Bees; and yet in the mean time ſo farre from offering injury or wrong to any, that he hath no ſting to hurt any (ſo *Gorapius*) but which is truer and better, hee never uſeth it to the hurt of any.

CHAP. III.

The Definition and Deſcription of a Bee.

A Bee is a Flying Inſect, four winged, ſix legged, beſt skilled in making of Hony, her ſhape is little, brown, bowing, oblong, not globous, as ſome: Her eyes are covered with a horny membrane, or tunicle for their better defence and ſafeguard; they are of a ſhining black, like Jet, tranſparent as Glaſſe, immoveable, contrary to *Ariſtotle*, who ſaith, all Inſects move their eyes, as four-footed beaſts their ears; not ſunk within their heads (as *Mouffetus*) but ſomewhat prominent, no eye-brows: Their eyes are placed on the outſide of their cheeks, or rather are inſtead of cheeks; oblong, greater above than below, through which the ſpecies of things viſible are conveyed to the common ſenſe. The horns are called by *Ariſtotle*, *Antennæ*, becauſe they hold them forth before them; They are very pliable, and readily bending almoſt every way: they grow almoſt at the top of either eye, for defence with two joynts, one cloſe to the head, the other towards the middle, ſo that ſhee can put them forth at full length, when ſhee will, and draw them down again cloſe to her head: And they are the proper inſtruments of the ſenſe of feeling, by which, with the leaſt touch, ſhee ſuddenly ſenſeth any tangible object.

Mouffet. Theatr. inſector.

Ariſt. de partibus, animal. lib. 2. c. 13. and alſo Plin. lib. 11. c. 37.

The

The Drones eyes are farre larger, being almoſt two thirds of their head, with two moveable wreathed horns, growing out together between the eyes, but extending like a fork.

For gathering her proviſion, ſhee hath two inſtruments, her fangs, and her tongue; her fangs in faſhion of a pair of pincers, hang not as the jaws of other things, one over another, but ſide-waies, one againſt the other: Her tongue is of that length, that her mouth cannot hold it, but being doubled between her fangs under her throat, it reacheth to her breaſt; it is divided into three parts, whereof the two outmoſt ſerve as a caſe to cover the third, which being the chief, the Bee in her work, putteth forth beyond the other, and draweth in again as ſhee pleaſeth, and this third is likewiſe parted into three; ſo that there are five in all.

In their fangs or chaps, wherein are their teeth, their principal ſtrength conſiſteth; for in their conflicts, where they ſlay one with their ſting, they kill twenty with their teeth, quickly biting off the wings, or breaking the leggs of their adverſaries: And therefore Mr. *Butler* was ſomewhat deceived, who accounteth this pinching of other Inſects (for againſt them only do they uſe them) to bee rather a chiding, than a fighting, a warning, than a puniſhment; being indeed a deadly and mortal inſtrument of revenge; ſo that after a battel you ſhall ſee them lye ſprauling, hopping away, and crauling in great multitudes, either drawing on the ground one, or more of their leggs, or doubling the nether part towards the ground, or turning the ſame awry to the one ſide, or other, but as many as are bitten, within a ſhort ſpace will certainly dye.

They runne at firſt limping away, but ſurvive very little: And that they are not ſtung to death, that in ſuch variety of motions, proclaim their various hurts is very apparent.

Firſt, Becauſe there is no ſting appearing in them; nay, more die lamed in their leggs, than hurt in all other parts; and beſides, their leggs are not ſuſceptible of a ſting: And if you obſerve many of them, before they be let go by their Antagoniſts, the Victor retains her ſting ſtill: But ſaith one, their skin is ſo thin and dry, their ſpears come away again without hurt to themſelves; but this is not ſo, for I have often ſeen them ſtricken in their backs, and breaſts, and alſo between their pleights, or ringles of their. Mr. Remnant Hiſt. of Bees. c. 3.

their nether part, and the ſting herein detained. It is true in a great Carnage, very few are ſtricken with their ſting, or ſpear which they are loath to uſe, when their fangs will right them; as they will againſt Inſects, becauſe it is deadly alſo to themſelves.

——*Animamq; in vulnere ponit.*

But their ſtings they chiefly uſe againſt men, beaſts, and Fouls, for knowing that their bitings are little, or no way prejudicial againſt ſuch able creatures, they will kill themſelves to injure others: for their ſting like a barbed arrow, once entred into skin or fleſh, is holden ſo faſt, that they cannot draw it out again; and when they would bee gone, leave therefore a part of their entrals faſtened to it, ſo that when they overcome by ſtinging, they get a Cadmian victory, loſeing thereby their own lives. They are hairy almoſt all over their bodies, eſpecially the fore-part.

Ariſtot. de partibus animal. lib. 4. c. 6.

A Bee hath four drye pelluced skinny wings (and ſo have all Inſects that live in fields, and wander about for their food) two are growing near together, on either ſide of their ſhoulders, but the inmoſt are ſomewhat ſhorter than the other, leaſt they ſhould hinder their flying; and theſe ſwiftly convey them into every place (though ſome miles remote) round about their habitations, until by often uſing of them, they grow torn and jagged (the infallible characters of old age, and death) and are unable to ſupport them, yet will they venture forth (but with the price of their lives) not being able to return.

Cardan. de ſubtil. lib. 9.

The hinder part of their bodies is full of ringes, or pleights, of which this reaſon is given: the beginning of motion muſt bee in ſome part, which if it were hard, could not be moved, but with the leggs, as Crabbs, but if it were all ſoft, it could much leſſe be moved, becauſe there is nothing firm: and therefore there is a neceſſity of theſe ringes, that interchangeably the hard parts may be mixed with the ſoft.

Their tails are ſomewhat ſharp (the Drones more obtuſe) within which is their ſtings joyned to their entrals, which ordinarily lie hid (as *Ariſtotle*) leaſt they ſhould bee ſpoiled, but they readily exert, and put them out on all occaſions rather (as I ſaid)

ſaid) to offend men, and beaſts, than their own kinde: there is another uſe of them for the conſumption of the ſuperfluous humidity. Avicen de ānima, lib. 8, c. 3

They have a place for evacuation under them, and for generation alſo, as ſome conceive. Her feet are ſix, dew-clawed, pliant, full of joynts, hairy; and as it were, two toes at the extreamity of either foot: her hindmoſt feet are longeſt, that ſhee may put them forward to her formoſt, which receive from her tongue the Bee-bread, and wax, and working it on the thighes of the hindmoſt, ſhee ſtands in the mean time on the middle-moſt; and though ſhee can, and doth ordinarily ſtand and go on all her feet, yet the two foremoſt have with her the uſe of hands, therewith ſhee ſtroaks and clears her eyes, before her ſetting out, but principally in her working for the diſpoſing of her labours to her thighs. All her feet are ſcabrous, and rough, to take hold at the firſt touch, and not that the flowers which they carry may readily ſtick on them, as one ſaith; this cannot bee, for they carry no flowers, but ſuppoſe him to underſtand the Bee-bread gathered of flowers, yet ſtill he fails, for this is carried on the thighs, and only of the hinder feet. Aldro. vand. de Inſectis lib. 1.

In their head is a brain, their back and breaſt is a kinde of reddiſh fibrous fleſh, in their ſtomach, is a heart and other neceſſary members (of which more afterwards) in the hinder part of their bodies, is a little bottle, or bladder (it is not in the ſtomack, as *Mouffet* delivers) the mouth of it reacheth, or openeth into the ſtomach.

In this they carry hony, which with their heat, they defecate, purge, and concoct, whereby it laſts longer than all Aerial Hony, or Manna, and rarely, if at all, corrupts. Sometimes they carry water, likewiſe in this bottle, and not in their bill, according to Mr. *Hill*, his expreſſion, nor yet in the ſoft moſſineſſe of their whole bodies, as hee alſo delivers; they have but one contracted entral, which extended, is as long as the body: The excrements are liquid, fluid, and yellow. Mr. Hill Treatiſe of right ordering Bees.

Ariſtotle in the Deſcription of the *Chameleon*, a vile (and in many Countries a Vulgar) Creature, is very exactly, particular, and large. *Scaliger* having commanded this, and wiſhed for like diligence in others, ſaith, My judgement is, that a Philoſopher muſt Julius Cæſar Scaliger com. in Ariſtot. de Hiſt. Animal. lib. 2. c. 14.

must omit nothing, for though some things bee known to some, yet it is a secret to many, wherefore, whosoever writes, seeing hee writes to all, must do this common courtesie to all.

I question not, but that many will account mee too full, nay, tedious many times in this discourse; but I cannot shut a long foot into a little shooe, nor enclose so many Iliads of observations (as one did the Iliads of Homer) in a Nut-shell; for this would prove an *indecorum*, for though the Bee is little among such as flye, yet her fruit is the chief of sweet things; and shee is full of wisdome: and as the great Ocean hath in it things creeping innumerable, both of small and great beasts, so doth the Bee afford observations innumerable, Politica', Morals, Physical, and Metaphisica', it is no wonder then if the Fishermen in this Sea cannot take all, yet with industry may they have draught enough, and such plenty of various speculations as may delight, if not satisfie the patient Reader. Too much curiosity may drown us with *Aristotle* in the bottome of the Sea, or burn us with *Pliny* on Mount *Vesuvius*.

Eccleſia. cap. 11. v. 3.

CHAP. IV.

Of the Kindes and Colours of Bees.

Aristot. de Hist. Animal. lib. 9. c. 40.

Albert. Mag. tract. 4. c. 2.

Aristotle reckons up nine sorts of Bees, and *Scaliger* commends this distribution, wishing hee had been so exact in other creatures, whereas here hee abounded more in words, than things. *Albertus*, herein *Aristotles* Ape, enumerates as many, but in strange and barbarous termes, which it seems he forged in the shop of his invention: But whatsoever the Ancients have related concerning diverse kindes, and some Neotericks, to appear as knowing as any in former ages, have described; wee in these parts of the world acknowledge (because we know) but one sort of Domestick hony gathering Bee: Some indeed live in woods, as wild, others in hives, as more familiar and milde; but these interchangeably shift their habitations: And I question not, but the wilder (because more remote from the company of men) by familiarity will prove as gentle as any.

Aristot. de Hist. lib. 5. c. 19.

Aristotle commends a little round Bee in the first place, and in the

the next that which is somewhat long, and in shape (not colour) like a wasp. But (as I said) wee have in these parts of Europe, but one sort of domestick Bee. And yet *Pliny*, *Varro*, *Columella*; and in a word, all receive this distribution of Bees from him; And which is more, hee confounds the Drone into two sorts, a Thief and a Drone, which *Scaliger* reconcileth well thus, that by the Theef is to bee understood that which others call a Drone.

Varro citing *Menocrates* tells us of three kindes of Bees, one black, a second red, a third party-coloured, which hee commends for the best. Varro de re rust. lib. 3.

In all the Islands of the *Molucca's* their hony is made of certain Flies lesse than Ants. It is a report not confirmed by any, but supposing it true, the Bees (not Flies) were small, like unto the *American* Bees, and the Ants great, such as are in some parts of the *Indies* greater than our Flies. Pigafetta.

Moreover, there is some difference in the bignes of Bees, but it is accidental, for they that are loaded (especially with water or honey) seem greater and longer than those that are empty. The Nymphs also when they come first abroad are not grown to the full bignes, which afterwards they have; and the old ones do wither and become little again.

Likewise in these three Ages their colours also do vary; for in their middle age they are brown, whereas before they are more pale, and at the last they grow grey, or whitish again, but these are differences of Bees in the same hive, and not of one hive from another, since these divers sorts are in every Hive.

The report is, That all Bees were at first of an Iron colour, but for feeding of *Jupiter*, had this reward bestowed on them to bee changed into a golden colour. But not to insist upon Fables. Natal. Com. Mythiolog. lib. 2.

In some Countries there bee white Bees, *Aristotle* saith, in *Pontus*. Many such are in *America*, not because they are thinner, or of a more transparent substance, or feed more finely as some, rather they are a fainter and feebler kinde of Bees, for white is a penurious colour, and where moysture is scant, so blew Violets, and other flowers, if they bee starved, turn pale and white. Some assign this as a cause of colours, the excremen- L. Verulam Silva Silvarum cent. 1, §.

mentitious moysture, which as it passeth through a courser, or more fine, and delicate strainer, so are the colours brighter or darker. Others, Bees are not therefore brown or black, because their thin substance is easily dried, and that which is burnt and moist as a coal becomes black. Nor are Bees of one colour more than Wasps, because they feed of fewer sorts of food, than Wasps: For colours are disposed unto all things by the great Creator, of which no more certain reason can bee given, then why some men are Negroes, others are not.

Card de varietat rer. c. 28.

Arist. de gen. animal. l. 5. c. 6

Now Negroes are not black by reason of their feed, this is confuted by *Aristotle*; nor yet by the heat of the clymate, for this is confuted by experience, in that Countries as hot, produce of a different colour, who can certainly shew why about the *Magellanique-Straits* they are so white? about the *Cape de Buon Speranza*, when as in the *East-Indian* Isle, *Zeilan*, and the Coast of *Malabar*, they are black both in the same parallel. Nor of the soyl as some have supposed, for neither haply will other races in that soyl prove black, nor that race in other soyles grow to bee better complexioned; but rather upon the curse of *Noah* upon *Cham*, or the posterity of *Chus*. But of this can wee bee no more assured of than the former; for *Chus* inhabited a part of *Mesopotamia* watred by *Gyon*, a river of Paradise, and one of the branches of *Euphrates*.

Seldens illustrat. on Dray t. Polyalbion, 1. song.

Onesicritus apud Strabon. l. 11.

Sands Relat. lib. 2.

Some leaving the hot impressions in the aire, attribute it to the driness of the earth, as though the *Libyan* Desarts were not more dry (and yet the people no Negroes) than many parts of *Africa*, where they are all blacks.

Some ascend above the Moon to call some heavenly constellation and influence into this Consistory of nature, and there will I leave them; yea, I will send them further, to him that hath reserved many secrets of nature to himself, and hath willed us to content our selves with things revealed: As for secret things both in heaven and earth, they belong to the Lord our God, whose holy Name be blessed for ever, for that hee hath revealed to us things most necessary both for soul and body in the things of this life, and that which is to come.

CHAP.

CHAP. V.

Bees nature and properties.

BEES are neither absolutely wilde, nor altogether tame creatures, but of a middle nature between both. Some Bees are not (as some conceit) ignorant or negligent in gathering honey, and framing their combs, but yet serviceable in meaner imployments (as fetching water, watching, and warding) but all are naturally skilfull in all their proper labours, and interchangeably perform them. Their sting is more often the cause of their ruine, than instrumental for their relief; for loosing it (which they alwayes do when they sting) they unavoydably lose their lives; but with the fear of it they often chase away timorous persons from their Hives.

Some fancy that the cause of their humming noyse while they flye, is, least they should bee deprehended for theeves; whereas the robbing Bee, or theef, boldly discovers his purpose, as soon as hee comes near the hive which hee intends to assault, with a loud threatning noyse, proclaiming their destruction, if they shall resist, and not willingly permit their goods to bee plundered, endeavouring by fear to betray the courage that self-preservation should arm them with.

That some Bees stay at home to receive the labours of those that go to work (as *Aristotle* delivers) is but a fable; hee saith the Bees returning from their labour, shake themselves, and three or four attend and follow, and ease them of their burden. Arist. in histor. Anim. l. 9 c. 40.

That they carry in a windy season little stones to poise themselves, is a false relation; yet in a storm they will help themselves by flying under the Lee-side of an hedge, or encompassing a high and hilly place (if there bee any) and so as it were by making a board (as Sea-men speak) take the advantage of the wind. But if it bee a plain Champaign Country, where evasions avail nothing; then if the wind blow strong against them, they flye low, and almost close to the ground, and rest often.

Aristotle saith, The smaller Bees are more industrious than

the greater; his reason is, their wings are worn and jagged, their colour black, and their backs bowing, when saith hee, the greater are smooth and beautiful (like idle women) when indeed they are originally of one magnitude, but growing old, their bodies, are small thin, and grey, and their wings torn and tattered, a certain symptome of an approaching death, whereas the others beauty, and lustinesse is a Crysis of their youth, not their idlenesse.

In the morning they are husht and still, saith *Aristotle*, untill one (surely the Matter of the watch) with two or three loud buzzings calls them all up as it were to work: But no such exciting sound could I ever hear; nay I am confident there is none at all. But some such like thing is practised by the Apes which some have transferred to the Bees.

Capt. Jobsons Colden trade.

Near the River *Gambra* in *Africa*, and in many other places it is certain, that the Apes gather together towards night, some hundreds in a company, and in the trees (especially near the Rivers side) dance their *Lavolita's*, and perform many strange Garbo les; but about the setting of the Sun, one of the company (called by the English Mr. Constable) with two or three loud voyces ceaseth all their disports, and after that they continue quiet and silent untill the next morning when by a like voyce they have liberty given them to play and recreate themselves.

When the Bees likewise return from work, they are (as *Aristotle*, and others) a while in a tumultuous hurly burly, and then by degrees make less noise, and less, untill one flying about gives notice as it were that they must all to sleep; but it is nothing so, for in full Hives in the latter part of the Spring, and in the heat of Summer, they make a great buzzing sound all night. Bees live in a Martial discipline like Souldiers in a Garrison, some alwaies watching and warding, understand it of the Summer season, when the chilling cold, or nipping frost doth not force them into their Hives: yet in the day time they continue it longer.

A hot Sun-shine or warmer aire (even in Winter) will quickly prompt them out of their Hives to take a short vagary near their stalls, but if the cold bee intense, they are quiescent, if not dormant.

Bees

Bees are indefatigably, that I say not covetously laborious, alwayes working, but never satisfied, alwayes toyling, but never coming to a period of their endeavours, still progressive, never at their journies end, being impossible to bee stinted, and the longer they work, the more earnest they are, and impatient of delayes, or loyterings, while there is matter to work upon in the fields, and the weather is seasonable. Nay if the flowers decay and grow scanty; The Stocks that have enough, and to spare, will to keep themselves doing, rob from their neighbours.

For every Hive, or Commonwealth, endeavours to bee a Non-such, and to engross all within its own circumference, and by any means to make it self the increasing figure, though toyl, and restlesness continually attend it.

They are not offended with red coloured cloaths as some affirm, nor yet inebriated with sweet ointments, no nor much offended with stinking savours: I have known twenty Hives together stand against a dunghil divers years, and thrive and prosper well, yet would I not perswade any to set them in such a place if hee can provide another.

They express not more love to their keepers than strangers, but they being used to them with greater confidence venture among them, which some (more fearful) beholding fancie, that the Bees respect and love them more than strangers; whereas would they boldly come among them, nay take them in their hands, and carry themselves peaceably towards them (except when they bee irritated and offended before) they should finde all love and favour from them. They feed not on any flesh, nor need *Pythagoras* caveats for that purpose.

That some Bees gather not honey, but water for the King, and his guard, is a meer fable, for they mutually perfom all imployments. Ælian lib. 1 cap. 10.

That there is such an order that the elder Bees should have a proper place in every Hive, and the younger another, peculiar to themselves, is (as most of the opinions of the Ancients) a fabulous narration, for they are all promiscuously mixed together.

Bees (as many other Insects) have neither visible bones, nor Cartilages, nor Nerves, nor fat, nor flesh, nor a brittle shell,

as some land, and Sea-creatures have, nor that which may bee properly called a skin, but a body of a certain middle nature between all these like to a dry Nerve, but far softer.

Their body is divided into three principal parts, and there is motion in every part severed one from another, so that whatsoever is the reason of their life, it is not fixed to any one member, but in the whole, and therefore *Pliny* was deceived, who accords in the former, but denies that Insects, and therefore Bees have any symptome of life by motion in the head, except it bee cut off with the breast. *Aristotle* taught him this lesson, which without trial hee took upon trust (as many more.) And *Scaliger* also after him, and is not content to entertain an errour, but insolently insults over *Galen*, for placing the chief residency of the soul in the brain.

Arist. de hist. Animal l. 4. c. 6.

Scalig. com in loc.

It is true, that the heads of Eeles and Snakes cut off, live not long, when as the body lives a great while; nay a speedy way to kill an Eele, is to peirce her through the middle of her tail. Upon dissection I have found that onely the head being cut off, the horns, the chaps, and the tongue also will stir, and that a great while after the separation from the body. Now the reason hereof may bee this, Bees have the spirits diffused, almost all over, and therefore they move in their several peeces, whereas men and beasts move very little time after their heads are off: And therefore it is certain, that the immediate cause of death, is the resolution or extinguishment of the spirits, and that the destruction or corruption of the Organs, is but the mediate cause; but some Organs are so peremptorily necessary, that the extinguishment of the spirits doth speedily follow, but yet so, as there is an interim of a small time; but for Worms and Bees the spirits are diffused almost all over, and therefore they move in their several peeces.

L. Verul. cent. 4. exp. 400.

Further to illustrate this, *John Leo*, reports that men condemned to suffer death in *Egypt*, have lived a quarter of an hour, divided asunder set upon a heated Caldron, sprinkled with unslaked lime, and understood, and given answers.

Jo. Leo.

A living creature is sensible in every part, so that it can exercise it in regard of heat, and can also perform in every office that the organ, or instrument for that office is remaining; and hence are determined many controversies.

Card. de subtil. l. 9.

Some

Some query whether a living creature can subsist without the head, others whether without the heart? Without the head they are not sensible, but live; without the heart they are sensible, but the heat quickly decayes, and motion, and life also.

Bees revive easily when they seem dead, being brought to the Sun or fire; the cause whereof is (as before) the diffusion of the vital spirits, and the easie dilating of them by a little heat; they stir therefore a good while after their heads are off, and that they bee cut in peeces, which (as before) is caused for that their vital spirits are more diffused throughout all their parts, and less confined to organs, than perfect creatures. L. Verul Sylva Sil cent 7. 699.

Augustine mentions the same with astonishment and wonder, supposing that no reason can bee rendred for it, but that it is a secret work of God, lest one soul should seem to bee divided into so many parts. *Aristotle* saith, that Insects are most like plants, because they have many beginnings in their essence, for as plants cut in peeces live, so Insects for a time, but plants more fully. August. lib. de quantit. anim. c 7. Aristot. de part. b. animal. lib 4. c 6

Bees when they flye lift themselves up; thus they do when they arise from the Hive, but they can flye forth-right, without any visible elevation of themselves. *Aldromandus* would give a reason for it, because, saith hee, they want a taile, and therefore continue not long in the aire. But this by experience is found to bee otherwise, and birds that have long tailes, yet have a jumping motion in their flight, as the Wagtaile. Arist. de hist. anim. l 4, c. 9

When the Hives are full of Bees, and well supplied with meat, neither moths, nor any other hurtful creature can much endanger them; but when they are few and weak, they easily miscarry by every adversary; so that it is not a signe of a better sort of Bee, as *Aristotle* delivers, but onely of want of numbers or strength, when they neglect their own preservation, which sometimes they having formerly endeavoured, and finding their labours fruitrate, they grow desperate and careless; but though in number they bee but few, and therefore their dangers many; their provision little, and therefore their fare poor and pinching, yet will they not forsake their own Commonwealth to communicate of the wealth or strength of others, but without repining rest contented, yet by diligence endeavouring to improve

prove their ſtore and numbers. But when they are ſo few that they cannot thrive alone, they will with a general conſent (except their Generals, to whom ſuch a reſolution is deadly) ſometimes joyn themſelves to another Hive, but alwayes with hazard, often with deſtruction.

Bees delight to play abroad before the Hive, flying in and out as thick as if they were fighting or ſwarming, in breeding time, once a day uſually, if it bee fair weather, and ordinarily at a ſet time, each Hive obſerving the ſame hour of the day if it bee fair; and then they will expatiate and dance the Hay in circling motions, and ſurrounding Vagaries; and at other times when they have been long ſhut up with cold, or cloſer weather, the firſt fair day they will thus abroad both to recreate themſelves, and alſo to eaſe their bodies, for they evacuate for the moſt part flying.

CHAP. VI.

Bees Politicks, Ethicks, and Economicks.

ONe drop of water hath no power, one ſpark of fire is not ſtrong, but the gathering together of waters called Seas, and the communion of many flames do make both raging and invincible elements. And *una Apis, nulla Apis*, one Bee is no Bee, but a multitude, a ſwarm of Bees uniting their forces together, is very profitable, very comfortable, very terrible, profitable to their owners, comfortable to themſelves, terrible to their enemies.

Bees are political creatures, and deſtinate all their actions to one common end; they have one common habitation, one common work, all work for all, and one common care and love towards all their young, and that under one Commander, who is not an elected Governour; for the vulgar often want judgement, raiſing the worſt and wickedeſt to the Throne; nor hath hee his power by lot, for the chances of lots are abſurd, and ridiculous, conferring command often upon the meaneſt: Nor is hee by hereditary ſucceſſion placed in the Throne; for often through pleaſures and flatteries are they rude and ignorant

Baſil. Concio. in Gordium Martyr. & Hexamer. homil. 8.

of

of true vertue, but by nature hath hee the Sovereignty over all, excelling all in goodlineſs, and goodneſs, in mildneſs, and majeſty.

They have all the ſame common laws, and with common care, obſerve them all, and have one common bond, not to have any thing lawful for one, which is not lawful for another, but whatſoever is lawful, is lawful for all. And they have one common reſpect, and reverence to their Commander by whoſe counſel their Commonwealth is governed; a common houſe, a common care of poſterity, common labour, common food, common generation, a common uſe and fruition of all things. Ambroſ. Hexam. l. 5. c. 21.

A Bee, like a man cannot live alone, if ſhee be alone, ſhee dies: As in the Fable of *Menenius Agrippa*, the whole body ſoon periſhed, when the reſt of the members to eaſe themſelves wronged the belly; ſo the whole Commonwealth of Bees will quickly bee diſſolved if they labour, each Bee for her ſelf, and neglect the publick. Nay the Drones, though they bee idle, yet are uſefull inſtruments for the good, and preſervation of the Commonwealth. J. Strobeus laus nuptiar. p. 67.

The Polity of Bees is admirable and imitable: *Plato* and *Cicero* after a divers manner preſcribed the form of a Commonwealth, one how it ought to bee, the other how it was of old, but both lay down this as a maxime, that a civil life ſhould imitate nature which is the beſt inſtructer. But what is Natures leſſon, the irrational creatures beſt expreſs, and chiefly Bees, and therefore *Plutarch* ſends his *Trajane* to *Virgil*, that hee might borrow a civil life from the Bees. For a civil man by natures rule is alwayes chiefe of the City, as the Commander among the Bees. Plutarch. reip. gerend. precep.

And again, hee ſaith, Bees conſerve community unto their laſt; for no man ever ſaw a Bee degenerate into a Drone, which ſome require of Civil Governours, that the vigour of their age being paſt, they ſhould live idle at home. Great ſpirits degenerate not. Plutarch. an ſeni ſit geren. reſp.

They expreſs if not great reverence, yet I am ſure great love to their Commander, without whom, they will bee, they will do nothing, and with whom they will bee any thing, go any whither, ſtay any where, bee content with any thing. Pet. Matthew continuat. Gen h. ſt. of France.

The Poet elegantly thus writes,

Virgil. Georg. l. 4.

Besides not Egypt, *nor rich* Lydia *more,*
Nor Medes, *nor* Parthians *do their King adore;*
Whilst bee's alive in concord all obey,
But when bee dyes, all leagues are broke, and they
Themselves destroy their gathered food at home,
And rend the fabrick of their Honey-combe;
'Tis bee preserves their works, him all admire,
And guard his person with a strong desire:
They carry him, for him they hazzard death,
And think in War they nobly lose their breath.

Polytius.

Xantippus therefore the *Lacedemonian* being General of the *Carthaginians*, said, Hee had rather serve under the Commander of the Bees, than lead an army of Ants. I say, under the Commander of the Bees, who useth not his sting, that is, exerciseth tyranny against none, and orders nothing but that which is profitable for the Commonwealth; when as they that lead an army of Pismires, that is, men who neither will, nor know how to obey, never perform any thing notable, and praiseworthy; so that aptly *Homer* describing the *Greeks*, hastening to the Oration of *Agamemnon* the General of the whole Army; and as hee calls him the Pastor of the people, compares them to Bees swiftly flying with their labours to the Hive, where their Commander is constantly resident.

Homer l. 2. Iliad.

Aldrovand. de insectis lib. 1. Cælii Calcag. Apol. pro Alfonso duce Ferrar. Cornucop. Pyr. Perotti. & Petr. Crinitus de honest. disc plin.

The *Egyptians* on this ground placed on the top of the Kings Scepter the bird *Cucuphus* (which is a Stork) with a River-horse underneath it, implying that piety must suppress impiety, clemency ferity. And from hence the Tribunes of the Souldiers among the *Romans* carried their swords without edges, intimating that the Generals of Armies ought not to kill the Souldiers, but to correct them, as the Commander of the Bees doth her subjects; and perhaps on this ground, the *Egyptians* by the Hieroglyphick of a Bee signified a King, because it becomes a Commander of a people, to mingle with the sting of justice the honey of clemency.

Memorable to this purpose was the practise of a certain King of *France*, who having conquered the *Insubrians*, and entred

entred their City, by a ſymbole or type thus expreſt his clemency, wearing a coat full of Images or pictures of Bees, and this Motto written upon it, *Rex mucrone caret*, the King wants or uſeth not his ſting. Baptiſt Mantuan in exhort ad Inſub.

Their Ethicks and Economicks appear in many particulars. They make frugality the baſis of their ſubſiſtance, and therefore as they laborioufly gather ſtore of honey they ſhut up the Cells ſtill as they fill them, and untill Winter come, will not open them, but live in the mean time of Bee-bread, and ſuch proviſion, as they get abroad, leſt if they ſhould prodigally waſte while they may work, they might after ſtarve when they cannot work. And in the pleaſures of this life they are ſo moderate, that perfect temperance ſeems to reſt onely in them.

They are neat and cleanly creatures, never ſuffering any filth or excrements long in the Hive, emptying themſelves alwayes abroad. And if in the Winter while they are weak, and not able to indure the colder aire, filth bee contracted, yet as ſoon as the Spring comes, and they grow numerous, and ſtrong, they diligently cleanſe their Hives, and carry out all.

Their cleanlineſs alſo thus appears, That they will not ſuffer their dead to continue long in the Hive, but carry them forth to burial.

Their chaſtity is admirable, for whereas many other creatures couple together openly; Waſpes alſo and Humble-bees, and many ſorts of wilde Bees ſcarce ſpecifically differing from them, yet whatſoever the Bees do in *Venus* ſervice they act in ſecret, and far remote from the eyes and knowledge of all men.

The Poets ſay, That this is the reaſon of it. *Saturn* the husband of *Ops*, and father of *Jupiter*, was wont to devoure his own children when they were brought forth (the reaſon of it was, becauſe *Saturn* was named the god of time, and all times paſſing and returning, revolve again into themſelves) which gave occaſion to this hiſtory; when *Jupiter* was born his mother *Ops* fearing the cruelty of her husband to him, concealed his birth, and the *Cretans* for fear that *Saturn* ſhould hear the childe cry, rung their brazen pans and kettles, which noiſe the Bees following, came to the place where the Infant was,

and fed him there with honey. *Jupiter* for so great a benefit, bestowed on his Nurses for a reward, this admirable gift, that they should have young ones, and continue their kinde without wasting themselves in Venery.

Mr. May Annotat. on Virg. Georg.

Others report that *Jupiter* being much in love with a faire Nymph called *Melissa* turned her into a Bee, and for her sake bestowed this, and other priviledges on the Bees.

And they are not less valiant than chaste, though industry and diligence may do much with all other creatures, yet little with these, no not to palliate their fierceness, let them bee exasperated near their Hives, you may as easily binde a Lion with a single hair, as by opposition and resistance, compose and quiet them, though the creature is but little, yet *virtus non minima.* Is it not strange to behold such a little Insect to contend with the most mighty, to see such vigour in a creature without bones or scales, or hard defences, and yet to bee offensive to, nay prevalent over the most strong, and powerfull creatures!

Mr. Buller Femin. Monar. cap. 1.

In valour therefore, and magnanimity they surpass all creatures, there is nothing so huge and mighty that they fear to set upon, and when they have once begun, they are invincible; for nothing can make them yeeld but death; so great hearts do they carry in so little bodies.

In private wrongs and injuries done to their persons (for which cause men will sooneſt quarrel) they are very patient, but in defence of their Princess and Commonwealth, they do most readily enter the field,

Virg.

--- For them they hazzard death,
And think in War they nobly lose their breath.

Their War whatsoever some say to the contrary, is onely forreign, for though in the same Hive, by a violent or accidental congreſſion of two swarmes, there bee sometimes a deadly contest, and bickering, yet still it is forreigne, for they were never united under one Commander.

Mouffet Theatrum Insect.

They never fight (whatsoever some unexperienced Observers report) for food, nor fall out among themselves for meat, but alike communicate of all they have (though but little) and when

when it is spent (if it bee no gathering season) starve altogether.

Their Geometry appears in the fabrick of their combes; and their Astronomy in the knowledge of the weather, for they fore-know and presage windes and storms, and either keep themselves in their Hives, or go not far, perhaps fetch water, and quickly return.

When they flye not far from the Hive, but flye about it, the weather being serene and fair, it is an usual token of an approaching storm, or tempest, *Aratus* prompted him (if not experience) with this observation. Theophrast. l. 1. de sig. tempestat.

But above all, one excellent skill they have, which the most experienced females, though they much desire it, must yeeld themselves to want; for they know certainly when they breed a male, and when a female, which appears by this, that they lay their Cephen-seeds in a wide comb by themselves, and the Nymph-seeds in the rest, which are of a smaller size.

In their own Commonwealth they are most just, not the least wrong or injury is offered among them: but I cannot commend their justice towards strangers, for all that they can catch is their own, unless they may bee excused in this respect, that the Bees of divers Hives are at deadly feud, or rather as Kingdomes that are at difference one with another.

If Bees, creatures without reason, have such Prudence, Providence, Fortitude, Chastity, Loyalty, Natural affection, such Government, Order, Discipline, How much rather ought men to express the same in their carriages and conversations. If they abhorre Intemperance, Lust, Sloath, Rebellion, Cowardise, shall men practise them? They are then worse than Brutes, and deserve rather to bear the names of savage Monsters, than of civil and reasonable men.

CHAP. VII.

Of their Senses.

CReatures produced of putrefaction are little, and weak in the senses; defective in their exteriors, much more in their interiors; yea they altogether want wisdome, and are stupid. And therefore Bees are prudent, because they are generated of a certain matter, and not without a parent.

Cardan. de subtil. l. 9. Plin. Nat. Hist. l. 11. c 10. Arist. de Hist. animal. l. 4. Scalig. com. in Arist. de hist. an. l. 4. c. 7.

Bees have all the five senses, though there do not appear all those outward Organs of senting, which some other Animals have: And so likewise Fishes have no visible Organ of hearing and smelling; and yet hear and smell, there is not seen perfectly in their heads a brain, yet is it the beginning fountain and seat of all these senses, phantasie, and memory.

Of all the five senses their sight seems weakest, yet is it clear, especially afar off, which guides them abroad, and directs them home, though sometimes they are three or four miles from their Hives.

But their sight is not so quick near hand; for sometimes they will flye against you, if you come suddenly cross them when they are laden; and also near the mouth of the Hive, if they light besides the door, they will run up and down seeking for it, as if they were in the dark (hereby verifying this truth, That things neerest the eye are furthest from sight) but then up they rise, and flying back a little way, turn again with a better view.

Mr. Butler Feminine Monarch.

As many as fall besides the stool when it waxeth dark, ten to one but they lye abroad all night; yea if at such times being troubled by any thing, they come forth out of the Hive, although they bee fresh and lusty, they will leap up and down, run, and flye to and fro, untill they bee weary, but by no means can they finde the way in again.

And therefore it is, that when they flye abroad they take much pains at the door in rubbing, and wiping their horney eyes, that they may better discern their way forth, and back again.

It

It is said by some of the Ancients, that Insects have onely the sense of feeling, which is manifestly untrue, for if they go forth right to a place they must needs see.

Their smelling is quick and excellent, for they will sent honey a mile from their Hives, and make haste to it, and when they flye aloft in the aire by it, sent any flowry Mead or Heath near them.

As soon as the hony-dew is fallen, they presently sent it, although the Oaks that receive it bee afar off; which the Poet (speaking of the excellency of this creature in this sense) thus expresseth,

---- Ideoque per auras
Mellis apes quam longe ducuntur odore. Lucret. l. 4.

Their feeling is as active as their other senses, nay more, for it is most individuate, it inheres in the subsistence of the creature, and cannot bee separated, or taken away without the detriment, or utter decay rather of the subject wherein it is. It may therefore bee called the living sense, although in divers diseases and occurrences also oft-time befalling the subject wherein it is, it may be deprived of it. As we read of *Athenagoras* of *Argos*, who never felt any pain when hee was stung by a Scorpion. Mr. Brathwayt Third Essay of Touching.

Their feeling is so quick, that if you do touch a Hive very softly, or knock upon the ground near the stool, they presently resent it, making a general murmure, and many of them coming out of the Hive door, as it were to examine the cause.

And for their taste, this is evidently as active as their other senses; thereby they make choice of waters, and all other gatherings for their use and purpose.

And lastly, for their hearing, that also is good, though *Aristotle* doubts of it, nay denies it. *Cardan* saith, That Bees, because they are so small creatures, cannot hear and see too; but being flying creatures, there is a necessity of seeing, and therefore an impossibility of hearing; but hee contradicts himself, when hee tells us, though untruly, that every morning (all being yet silent if not asleep) one (the Constable sure, or the Master of the Watch) by two or three Bombes or shrill sounds like a Trumpet, calls them all up to their work; and so Arist de hist. an. l. 9. c. 40. Metaph. l. 1. c. 1 Card. de subtil. l. 9. Idem de varietat. rerum l. 7.

like-

likewiſe in the evening, flying about the Hive, with a ſmall humming murmure commands them to ſleep.

But if Bees hear not, to what purpoſe is the calling before they ſwarm, and alſo their encouragements in fight,---

Virgil. --- *And then a voyce*
Is heard reſembling Trumpets winding noiſe.

Scalig. Comment. in Ariſt. de Hiſt. animal. l. 9. c. 64. And *Scaliger* acknowledgeth againſt *Ariſtotle*, that they hear *ſigna enim dant intus, alia atque alia etiam foris, mutato murmure.*

But in a word, further to manifeſt that they hear: If a ſwarm riſe, and the Queen Bee miſcarry, and fall by the way (as it oft happens) her company notwithſtanding will light, expecting her coming. But being hived, they preſently miſs her; and with a mournful murmure bewail their condition. Some run up and down diſtractedly within the Hive, others without; and by and by making a ſudden ſtop, fall into a paſsion of mourning, and then run up and down again, and then mourn again, but in the mean time they ſend many to ſeek for her. I have often found her where ſhee hath been fallen, and taking her up, carried her to the Hive, where I have obſerved (not without admiration) how that at her firſt coming they have in a moment changed their former note and carriage, and with clapping of their wings, and a rejoycing murmure congratulated her preſence; and thoſe that were ſeeking about for her, although ſome rods diſtant from the Hive, in an inſtant, as it were, returned all home, and with a rejoycing gratulation welcomed their Queen. And therefore they have hearing, which ſhews likewiſe, that though their ſpirits bee diffuſed, yet is there a ſeat of their ſenſes in their head.

L. Verulam. Silva. ſilvar. cent. 7. 698.

And as they have the outward ſenſes, ſo have they the inward alſo, elſe could they not bee wiſe and prudent; underſtand wiſdome or prudence equivocal, ſo called by reaſon of the reſemblance it hath with true wiſdome or prudence, being able to finde out, and to manage convenient means unto natural and ſelf-ends.

F. Picolomin. univerſa phil. de moribus.

Vertue is not taken or underſtood one, but many wayes, ſometimes for the ſhadow, and a ſlight or light reſemblance thereof, in which ſignification Bees are called prudent, whereas prudence properly ſo called, belongs not to them.

Bees

Bees have memory, which is not a sense or imagination, or understanding, but a disposition or habit of any one of them, when the time also is joyned, or added to it, wherein the impression is made, and the vision is left in the minde; whence this is a consequence, those creatures have memory, which have sense and understanding of time, for wee remember onely in the sensual part of the minde; for if a horse hath been mired in a slough, when hee meets with the place again, hee will presently remember that hee was there mired. Cælius Rhod. Lect. Antiq. lib. 20. cap. 3.

And herein Brutes differ from men, That a reasonable creature doth not onely remember that hee hath seen, or heard, but also differenceth the spaces of the present time, from the time past; but Brutes onely know thus much, that they have fallen (into a pit, or other dangerous place) at this present, or sometimes formerly.

Again, a man observes that hee remembers, which irrational creatures do not. And among all living creatures they have the best memory, which have the most clear, pure, and perfect imagination, of which sort are Bees and Pidgeons.

As some creatures besides sense, have memory, and natural prudence, so some go further, for they are disciplinable; but none have experience, or very little.

Now by sense wee are to understand that sensitive knowledge which is onely in the presence of the object, whether it bee by the internal senses, or by the outward common sense or phantasie: For under the name of sense, the Philosopher comprehends whatsoever is necessary to perceive or understand in the presence of the object, but there is necessary in all, somewhat of the phantasie or imagination, to understand even that which is without. And therefore it is common to all brutes, as to understand, so also to have imagination; but memory addes an inward strength, and power of conserving the species and using them in the absence of the objects, that by this means any thing may remember those things which it takes in the sense, even then when they are not present, in regard of the externall senses.

This faculty, saith *Aristotle*, some creatures have, but not all, but yet hee declares not what creatures have, or what want it. They are commonly thought to have memory, which

may properly and perfectly bee moved from one place to a more remote, either by a progressive motion on the land, or flying through the aire, or swiming in the waters, for memory seems for this purpose to bee given to creatures, that they may bee removed to a distant place, either to avoid that which is nocive and prejudicial, or to finde that which is useful, which they have any wayes made trial of.

Further, some creatures, saith *Aristotle*, with memory, have prudence, which (as wee said before) is not to bee understood properly, but metaphorically, for they use not discourse, nor acquire a habit, whereby they may judge of what they are to do; but oftentimes so act by a natural instinct, and so provide for the future, as if they had reason indeed, and therefore by a figure are called prudent.

And this prudence of Brutes is a special sagacity in some, which by the instinct of nature, are so ordered as that they seem to imitate the reason and prudence of men; but all brutes have not this prudence, but those creatures that have it, are so perfect, that they have all of them memory.

And wee may adde further, that this natural sagacity, then chiefly merits the name of prudence when it is trained up, and perfected by the memory of former things.

Some creatures have not onely memory, but are also disciplinable, but others are not: Of this last ranke are those, which though they have memory, want the sense of hearing, for hearing is the sense of discipline; for wee see many creatures, dogs, and horses, act by external signes, but never without a co-operation of hearing, whereby they are called and stirred up to understand the signes.

A ist. Metaph. l. 1. c. 1. Now *Aristotle* sets down an example in Bees which hee supposed not to hear. But *Plinj*, *Scaliger*, and many others affirme the contrary, and by good arguments prove their Assertion.

Albertus willing to salve the Philosophers credit, invented this distinction. There is, saith hee, a hearing of a sound, as so, or of a voyce, as it is an articulate sound, now Bees bear in the former ways, not in the latter; but this latter hearing, saith hee, is necessary to make a creature disciplinable; but whether many disciplinable creatures so hear, might bear a great question; for

for although when they hear such words or sounds, they come, or flye down, or speak after the fashion of men, yet are all these things done by a natural instinct (supposing memory, and the experience of such a sign, or voice.) And therefore *Suarez* faith well, It were better to say all creatures which are disciplinable, have hearing, and perhaps sight, memory, and a metaphorical prudence or sagacity. But to leave these nicer disputes, (as perhaps by some supposed) impertinent to our present Discourse. Fr. Suarez Metaph. disp. 1.

CHAP. VIII.

Of the Queen-Bee.

THe Queen Bee is a faire and stately creature, longer by the half, and much bigger than a common Honey-Bee, yet not so big as a Drone, but somewhat longer. She differs from the Common-Bee both in shape and colour; her back is all over of a bright brown, her belly even from the top of her fangs, to the tip of her train, is clear, beautifull, and of a sad yellow, somewhat deeper than the richest gold: Her head is more round than the little Bees, by reason her fangs bee shorter, her tongue is not half so long as theirs; and thereby nature hath disabled her for working, for it is impossible for her short tongue to extract much out of any flower, were shee never so industrious.

Her wings are of the same size with an ordinary Bees, and therefore in respect of her long body, they seem very short, resembling rather a cloak than a gown, for they reach but to the middle of her train, or nether part. Shee hath streighter, and stronger legs and thighs than a Honey Bee, which are of the colour of their belly, but her two hind-legs more yellow. Shee hath a lofty pace and countenance expressing Majesty: That shee hath a white spot in her fore-head glistering like a Diadem, I never saw, though it bee frequently reported: Nay I am sure of the contrary.

Her nether part is much longer than her upper part, and more sharp than any ordinary Bees, having in it four ringles or

partitions, and in each ringle a golden bar in stead of those three whitish rings, which other Bees have at their three partitions. The spear or sting shee hath is but little, and not half so long as the other Bees, which like a Kings sword, is rather born for shew and authority, than any other use. I beleeve they cannot use their sting, for I have provoked and forced them to sting by hard holding of them, and putting their taile to my bare hand, but could never perceive them willing to put it forth. Nay when I have forced it out yet shee would not enter it in my hand.

In a word, the Queen Bee in her whole shape and colour, is a goodly and beautiful creature.

--- Velut inter ignes
Luna minores.

As the Moon when in a clear night, shee fills her circle, is more and more eminently beautiful than all the lesser stars, so is the Queen Bee among the other Bees.

There are not two sorts of Kings, or Queens in any Hive, as *Aristotle*, and after him *Pliny*; and the most have delivered, but onely one, and though a King in place and power, yet is in sex a female, *Vocantur ab aliquibus matres quasi quæ pariant.*

Arist de hist. Animal. lib 5. cap. 19.

That two several Queens or divers companies should agree in the same Hive, though divided in their works, and neither intrench on the others subjects and labours, although the Ancients very confidently deliver it, yet it is a meer fable*. Many Kings in a Hive, but falsly: As *Aristotle* makes two kindes of Kings, or Queens, so in every Hive hee would have at once several Kings, for although one bee enough for government, yet not for generation, saith *Scaliger*, supposing with *Aristotle*, that they were instrumental, as the males, for the generation of Bees.

* Mr. Googe 4. Book in Treat. of Bees.

The Queens cells wherein shee breeds, are not usually in the bottome, or under the combs, but on the edges, some on the outside, some more inward in the middle of the combs.

Arist. de hist. Animal. lib. 5. cap. 19. Scalig. Comment. in loc.

And they often exceed *Aristotles* number, who determines the m

them to bee six or seven, whereas in some hives there are not so many, in others nine or ten. Arist. de hist. Anim. lib 5. cap. 19.

It is a Chymerical fable that some have asserted, that the Bees first build their Commanders houses in the most eminent part of the combes, more large and beautiful than their own, and of the purest wax, and then inclose it with a waxen wall from the rest. Whereas indeed neither Commander, nor subjects have any particular habitations, for they live and lye between the combs, and the hexangle cells are repositaries for food, and nurseries for generation; and the orbicular cells are breeding places for the Royal issue.

And yet *Aldrovandus* delivers it as a received and ancient truth that the Queen Bees cells are made in a more eminent part of the hive, very large, inviroued with a fence, or wall, for an emblem of their greatness. Andro. de Insect. l. 1.

And as in conditions they are of three sorts, so they make a triple division of their cells; those neerest to the Queens Pallace, for the most ancient inhabitants, as the Queens guard, and next to those the younger, and such as are not yet a year old; but to the middle sort as the most strong and lusty are committed the extremities. This is a fancy also.

The materials for the Queens generation are yellow, and there is not first a worm, but presently a Bee, *ut aiunt*, saith *Aristotle*. And *Higinius* as hee is cited by *Columella*, saith, the Commander is not procreated of a worm as other Bees, but in larger cells than the Honey-Bees, are found holes filled with a matter of a red colour, out of which the Queen Bees are bred, even at first with wings, so that it appears there was some glimmering light among the Ancients concerning the Queens generation, but dark and uncertain. Arist. de hist. Animal. l. 5. c. 22. Columel de re rust. l. 9.

Know thus much, that into those orbicular cells is injected a spermy matter thick like cream, but inclining to yellow, wherein and whereout the Queen Bee is bred, it being both matter of generation, and augmentation, for shee is at first (when shee is visibly any thing) a perfect Bee in lineaments and shape, though not in magnitude and dimensions, and feeds of that wherein shee is bred, until shee comes to her perfection.

The Bees never destroy the Nurseries, or breeding cells of the Queen Bee, as *Aristotle* delivers, and also *Pliny*, although after they

they intend to swarm no more, they kill all the Royal issue then in being (nay although they bee imperfect embrioes) to prevent a future distraction.

Hesiodus. Before the Bees swarm, the Queen Bee by a peculiar and distinct voyce (*Hesiodus* calls it ἴυγγες, which wee in English say *Sing* for it is performed in a musical manner) some dayes before makes it known throughout all the Hive, that all may bee ready.

Ridiculous is the conceit of *Didimus* to pull off the extremities of the Queen Bees wings, that they may not flye away, for sometimes for recreation, and also for evacuation of their bodies, they use to go forth; and if their wings were cut would bee disabled to return.

I once had a good swarm likely to miscarry, the Queen Bees wings being accidentally torn, so that going out of the Hive, shee fell besides the stool, and could not get up again. And although once and again finding her before the Hive, I put her into it, yet afterwards shee went forth, and was lost. And almost all the Bees (in her loss) neglected their work, and began to pine away, untill I furnished them with a new Commander.

Ælian. lib. 5. cap. 12. The Queen Bee never voluntarily deserts her subjects, as *Ælian* and others intimate, affirming that the Bees diligently seek her out, and return her when shee hath fled away.

Oftentimes when a swarm goeth forth, the young Commander being weak, is not able to flow, but falls down, sometimes besides the stool, or sometimes further off, with whom some of the company will stay (such as being near her saw her fall) and encompassing her round will continue with her, except she bee taken up, and conveyed to the swarm or hive, untill they perish together. The Bees finde not their leader by the smell.

Ped. Mexia de Bedæ axiomat. Philosoph. & Cantipra. in bonum universale de apibus, lib. 1. c. 19. Many are confident that the Queen Bee never goeth off the hive, but with a swarm. *Cantipratanus* asserts this, but forgetting himself in the twentieth Chapter, hee saith, If her subjects bee weary with working, and cannot, or wander, and know not the way home again; the Queen Bee goes forth and findes them by their smell, and relieves them, and conducts them to the hive; but this is more fabulous than the former.

It

It is more than probable, that the old Queen Bees go forth sometimes with the latter swarm (whether out of curiosity, or wantonness, or indulgency, or dislike of her proper house, or love to her ancient subjects, I determine not) and this is the cause of the not thriving of many old stocks, after they have cast a second swarm; for although the Bees that are left, bee in a well replenished Hive, and therefore live out the Summer well, and work too, though not with that order and diligence as formerly, yet will they rarely breed, but by degrees consume away, and come to nothing. I have exactly viewed divers such stocks that I have taken, and could never finde a Queen Bee among them.

If therefore you perceive a hive, after it hath cast twice, to have some quantity of Bees, and yet to work negligently, or not to increase in the Spring, suspect them to want a Queen, and supply them with one as soon as you can, if no other way, by driving a poor swarm into them, for which purpose alwayes reserve some.

It hath been a constant tradition, that the Queen Bee hath a special guard alwayes waiting on her, and that when shee goeth forth, she is alwayes attended with them. I have often seen her to go forth, but alwayes without attendance. It may possibly fall out that some Bees may go abroad with her, and some others return when she comes back to the hive, but never as her special guard.

Mr. *Butler* saith, If the Queen Bee by her voyce bids them go, they swarm; this is warily to bee understood, namely of the latter swarm only; for the first is for ought I could ever finde out, at the will of the Commons; but there may bee a tacite consent of the Queen, but not solemnly by voyce, allowing their departure as in after swarms.

And again this is not alwayes true in second swarms, for after the Queen hath approved of their going forth, yet they will sometimes refuse, and manifest their dislike by massacring all the Infants of the Royal family.

I have observed some few Bees in the Spring in every good Hive, with crests, tufts, or taffels on their heads, some yellow, some murrey, in manner of a plume, some standing upright, some turning down, but in all other respects like other Honey-Bees.

Mr.

Mr. *Butler* ſuppoſeth them ſubordinate governours and leaders, as Captains and Colonels : They are ſeldome ſeen but in May, and a little after; that they have any authority, or command over the reſt, or ſpecial place about the Queen Bee, I beleeve not. This I am ſure, I never ſaw any one of them attend her in her ſhort progreſſes. Their working, I conceive wears off this ornament.

T. Cantiprat. bonum un verſale de apibus, lib. 1. cap 14.

The Queen Bee goes firſt out with the ſwarm, ſay ſome: but it is not ſo, for ſhe goeth almoſt laſt, ſometimes indeed ſhee comes forth half an hour before the ſwarm riſeth, with a great company which environ, and attend her on the ſtool; but her company moves not untill the greater part are paſſed out of the hive, and then thoſe that environed her begin to ariſe, and ſhee with them.

Ælian lib 5. c. 15.

And as in the emiſſion of a Colony, the Queen Bees go not before, neither are they carried at any time as ſome report.

Sometimes as I ſaid, ſhee comes forth before, and ſtayes without; at other times ſhee comes firſt to the bottome of the ſtool, and perhaps out of the door, as it were chiding their ſlackneſs; but then when the ſwarm begins to ariſe, ſhee returns in untill the greater part bee come forth, when ſhee follows, and where they uſually light, joynes her ſelf to them.

Bees are governed by a Queen, which many hold not properly to come to the ſupremacy by ſucceſſion, but by a judicious and prudent election, whereas it is moſt apparent, that the elder of the Blood-royal goes forth with the firſt ſwarm, and ſo the next in order with a ſecond, although ſometimes eſpecially in caſtlings, or ſecond ſwarms; ſome others venture forth. I have known eight go forth in one ſwarm, for they can but dye, going forth, and death is certain and inevitable if they ſtay. And a younger by dividing the ſwarm, or firſt getting the higheſt place of the Hive, may bee peaceably obeyed, with the deſtruction of all the reſt.

Nay being neceſsitated, their own leader miſcarrying in ſwarming, or by ſome accident afterwards. I have preſerved the ſtock by putting to them a Queen Bee taken from another. And once, becauſe I would bee ſure, I pared off a little of one wing, and ſome months after, for experience ſake, took the Hive

Hive, where I found that Commander put in by mee, and no other Leader. So that though ordinarily the Queen Bee comes to her government by birth-right and seniority, yet sometimes by election, as in the miscarriages of their old Queen, and in second swarms when two are united together.

When several Leaders go forth, one whose party prevails gets the Throne, and all the other competitors are slain. When their proper leader by some mis-hap hath been lost, I have given them another (as I said before) with whom they have well agreed, and prospered, so also in the union of swarms.

And although they are willingly subject to a leader, yet do they not altogether lose their liberty; for the first swarm goes alwayes forth at the will of the commons; and although the second, and also the third, must have the Regal assent which usually (being indulgent to their issue) upon petition they grant; yet if the Commons see it not convenient to diminish their numbers, upon the Queens grant, they kill the Probationer, and all of the Blood-royal; so that Prerogative avails little in the Commonwealth of Bees.

The Queen Bee (for it is an Amazonian Commonwealth) transcends in greatness and beauty of body; but which is most praise-worthy in a Commander, in mildness and gentleness, therefore though they have stings they never use them, which the breeding or mother Wasp doth, stinging more venomously than the smaller.

The Laws whereby this Commonwealth is ordered, are natural, not written in letters, but engraven in their manners; and so studious are they of peace, that neither willingly, nor unwillingly do they offer injury to any of their subjects.

Who will not hate the *Dionisii* of *Sicilia*, or the *Ottoman* family among the *Turks*, or the present great *Magore*, or *Persian* Tyrants? who (in practise) hold Monarchy to bee nothing else but a lawless exorbitancy in all manner of lusts and mischiefs, which ought to bee far from a good Prince, left while hee seems to bee a man, hee discovers himself to bee far worse than these irrational Insects.

And as their life is not vulgar, so neither their birth and original; for whereas all domestick Bees, at first are imperfect creatures, worms fixed to their Cells, wanting many senses for

twenty dayes together, and then that they may live a more perfect life after a death of twenty dayes, more transmuting their shape, come forth winged creatures; The Queen Bee is bred (as I formerly hinted) in another fashion.

There bee in every Hive ordinarily on the outsides of the combs (yet sometimes in the middle) but not near the verger, little concave cells (but one in a place) almost like acorn cups, but nothing near so broad, yet somewhat deeper, very strong and thick of wax, orbicular, wherein the Queen Bee injects a spermatical substance thick like cream, but somewhat more yellow, wherein the Queen Bee is bred perfect at first in all the parts, and lying almost round in it, feeds of it, and so grows as the chicken in the shell, first of the white, and then of the yolk (while the Hen sits upon it) untill it bee disclosed.

The *Athenians* banished *Pisistratus* from their City; and the *Syracusians Dionisius* from his Royalty; and many other people several Tyrants for their want of humanity and moderation: But in the Bees Commonwealth, never any Commander gave occasion of dislike to the Commons. Shee orders others what to do for the publick good, or rather nature directs them; shee is provided for, and maintained by their labour, and they directed, protected, and preserved by her society.

How the Queen Bee governs, I will not (as many conjecture) cannot certainly determine; each Bee readily fulfills, and follows her proper task, and all in all, aim at the publick welfare; none, how old soever, desiring a Writ of Ease, but all labour untill their labours kill them.

The Queen Bee lives not retired (constantly) in any part, but as occasion serves, is sometimes in one part of the Hive, sometimes in another, but works not, nature denying her fitting organs.

And because some have observed large orbicular cells on the edges (for the most part) of the combs, they have therefore supposed them to bee their pallaces, but they are scarce capable of half their grown bodies, and are onely seminaries for generation, not places or pallaces for habitation.

CHAP.

CHAP. IX.

Of the Drone.

THe Drone is a great Bee without a sting, the Vulgar opinion is, that hee is made of a Honey Bee that hath lost her sting; but no man ever saw that a Bee became a Drone.

Others seeing the fondness of this opinion, have thought that the Drone is a different species, and that as Bees breed Bees, so Drones breed Drones, which conceit, if the Author had observed, that at the time of their breeding, and many months before, there is not a Drone left alive to breed them, hee would have liked as well as the former. J. Stobæus de parentibus ser. 45.

Aristotle saith, That they onely are bred of the Bees; but the truth is, they are of the same species with the Honey Bee, but of a different sex.

Many reasons are laid down by Mr. *Butler* to prove the Drone to bee the male. Mr. Butler Feminine Monarch. c. 4.

First, becaus though they bee great Masters of the Honey, yet untill the Bees begin to leave breeding, and have conceived for the next year (which some do in *July*, most before *August* is expired) they suffer them, afterwards they begin to beat them away, which if some stalls do not, they dye naturally before *October*; and from thenceforth all the Winter untill the Bees breed again, there is not a Drone to bee found in *rerum natura*: When they are quite gone, then do the Bees lay no more seeds that year, but onely hatch and breed up those that are in the cells.

Secondly, becaus as the rather, and the more the Drones are, the greater and the earlier are the swarms: So where the Drones are few and late, there is small increase. And therefore if you kill the Drones of a Hive before they have done swarming and breeding (as some fondly have done before Midsummer, to save their honey) neither will the swarms come forth that were formerly bred, nor the stock thenceforth breed any more. After which time bringing in Bee-bread as much as before, and having no young ones to spend part, they lay it up carelessly in their cells, where it corrupteth and turneth to stinking,

ſtopping, which will cauſe them ſo much to miſlike their Hive, that in Autumn they will yeeld to the robbers. And if by your care and watchfulneſs they bee then preſerved, in *February* following, when the breeding time begins, finding their wombs barren, and therefore loathing themſelves, they yeeld their goods to them that will take it, and after a while by converſing with the ſtrange Bees, like of their company, and go away with them to their Droner. But every fair day they will with them return to fetch that they left behinde.

Thirdly, becauſe every living thing doth breed male and female of his kinde, and experience doth teach us, that the Bees do yearly breed as well Drones as honey Bees; and ſeeing the honey Bees are females, it followeth neceſſarily, that the Drones are the males of the ſame kinde: And therefore the Drone in the learned languages hath his maſculine appellation, as the honey Bee her feminine.

Fourthly, wee ſee the like in the likeſt Inſects, the Waſps, Hornets, and Humble-Bees, of which in their proper places.

Fifthly, I adde the Drones are males, and the honey Bees females, becauſe of the ſmalneſs of their voyce, which is alwayes ſmaller, and ſhriller in females than males, except Cows, which bellow lowder than Bulls.

Ariſt. de hiſt. Anim. lib. 4. cap. 11.

When the old Bees have ended their firſt brood of females, then laſt of all after the ſame manner, firſt in the Drone combe, which is one, and but one in every Hive, and almoſt the backwardeſt, made with deeper and wider cells for the nonce, they breed the male Bees, or Drones, as was long ſince obſerved.

Plin. Nat hiſt. l. 11 cap. 11.

In the latter part of the year they breed ſome promiſcuouſly with the Nymphs, but then they elevate their covers.

That not many are bred before Mid-May, not any before Mid-April (except a few by chance which are not ſuffered to live) as Mr. *Butler* aſſerts, is not ſo; for there are ſome in all ſwarms, and ſome ſtocks (with us) ſwarm by Mid-April, therefore muſt the breeding of many of the Drones bee then finiſhed.

And after a Hive hath ſwarmed, though before you ſaw not one.

one stir, yet then shall you take notice of their flying abroad every day about noon. But when the Hives are full, and yet swarm not so early as their fellows, they will then (but not often untill Mid-May) flye forth, and play a while, and then return into the Hive to fill their bellies.

But to put all out of doubt, that the Drones are males, I adde that the *Drone* in dissection hath two large testicles, greater, proportionably to his body than any other creature.

They are joyned together upward, but hang down towards the tail in two visible parts, of a whitish watry colour towards the ends, their ends or points are of the bigness of a small pins head, milk-white; the testicles are half as long as the nether part of the Drones body.

In the belly is a white entral longer when it is extended then the whole body. They have lungs (if my eyes deceive mee not) of a reddish colour, divided as it were in the middle. The outward part of the back and breast is of a grisly substance, under which is a kinde of flesh, all of a reddish colour, where is the heart, and other necessary parts, although (without a magnifying glass, by an expert Anatomist) not exactly to bee distinguished.

The eye hath a watry substance, and there is a visible brain in the head, of a reddish colour.

In the tail (which I had almost forgot, though often made trial of it) upon a little pressing, a saffron-coloured Ox-head, with stretched out horns, and a crooked snout will discover it self, which one (cited by *Aldrovandus*) pressing a Drone to experiment whether it had a sting, reports as a strange, and never before heard of relation (I often saw it before I read him, or any other.) And hee concludes that nature in this portent doth shew the seminal reason of them, and how being lost they may bee recovered; which how to effect, *Virgil* and others have at large discoursed. This is supposed to bee the instrument of generation.

Bernard in Gomesiu. Miedis, lib. 1 de Sale.

Mr Remnant discourse of Bees, l. 1. c. 2. Arist. de gener. lib. 4 cap 4.

The testicles are in the upper part of the belly; and so likewise the males among birds have the testicles drawn inwards.

L. Verul. Silva Sil. cent. 9. 852.

The difference between male and female, in some creatures is not to bee discerned, otherwise than in the parts of generation,

as in Horſes and Mares; but ſome differ in magnitude, and that diverſly, for in moſt the male is the greater; the chief cauſe is, for that the males have more ſtrength of heat than the females; now heat cauſeth greatneſs of growth generally, where there is moiſture enough to work upon: But if there bee found in any creature (which is rarely ſeen) an over great heat in proportion to the moiſture in them, the female is the greater, as in Hawkes. Heat alſo dilateth the pipes and organs which cauſeth the deepneſs of the voyce.

Ariſtotle delivers that the Drones are bred by themſelves if the Commander lives, but if ſhee dyes, they are produced in the Bees cells by the Bees, and theſe ſo bred, are more hardy and couragious than the other; but the truth is (as I hinted before) all Drones are bred by the Bees, when they are wearied, and almoſt ſpent with breeding of females, that by them they may have a new prolifical power whereby they may breed females afreſh; but the Drones are firſt bred in the Drone combe, which is afterwards at leaſt a great part of it filled with honey; and then in the latter part of the Summer, they breed ſome Cephens among the Nymphs.

Ariſt. de hiſt. Animal. l. 9. c. 40.

As *Ariſtotle* could not determine about the breeding of the Drones, ſo neither of the making of the Drone-comb, ſometimes hee layes it down, yet as the judgement of others (ſuſpending his own, as in a thing uncertain and dubious) that they made their own combs in the Hive, or did aſſiſt at leaſt the Bees in that labour; ſometimes that the Bees made the Drone-combs, but yet onely then, when there was great expectation of much honey; whereas in a Hive ſtored with Bees, there are not many dayes difference between the beginning of their own combs, and the Drone-comb. Nay they begin the Drone comb and half finiſh it, before they make the Nurſeries (for ſo I rather call them, than with *Ariſtotle*, houſes or pallaces) for their Queen, of which there bee alwayes ſome in every hive. And therefore *Ariſtotle* was deceived, who ſaith, They made the Queens Pallaces or Nurſeries onely, *Cum fœtus largior eſſet*, when they had a numerous iſſue.

The Bees never deſtroy the Drone-combes as *Ariſtotle* affirms, although they do the Drones, when they have no more need of them for that year.

Ariſtotle

Ariſtotle ſaith, The Drones are uſeful, if not too numerous, and the Bees becauſe of them more induſtrious, but wherein they are uſeful hee mentions not. Nay, hee allows the Drones no ſervice in the hive; but by his leave they are profitable to the well-being and generation of the reſt, being the males; and alſo by their heat in hatching the young, eſpecially after the ſtock hath caſt a ſwarm or more, there being few Bees left, and moſt of them in the day time abroad at their work.

But the Drone works not at all, as Mr. *Muffet* affirms, who ſaith, they gather wax, and ſometimes build the combs; but had hee ſeriouſly viewed them, hee ſhould have ſeen a diſability to gather, nature having denied them fitting fangs and tongue, for they are very ſhort, and not fitting to gather. Mr. Muffet Theatrum Inſectorum.

Ælian tells a long ſtory, how that the Drones lye hid among the combs in the day, but in the night when the Bees are aſleep, rob and purloyn the honey, which when the Bees underſtand (for moſt of them ſleep being weary with working, and a few onely watch) they firſt correct them gently, and drag them out of the Hives by the wings. But for all that they will not bee amended (for by nature they are gluttonous, and lazie) as ſoon therefore as they are gone abroad to work, they follow their work, namely fill themſelves with honey; but when the Bees return and finde the ſpoyl, they deal no more gently with them, but kill them out-right.

Once the Drones do not only ſerve for generation (as hath been ſhewed) but do alſo much help the females by reaſon of their great heat in hatching their broods. And for theſe cauſes they are alwayes in breeding-time mingled with them throughout the Hive: Although afterwards (when they have been much beaten, and can go no where ſingle, but one or other will bee on their jacks) they gather all together in a cluſter for their ſafety in one ſide of the Hive; ſo that it is true at ſometime, which the Philoſopher ſpake indefinitely, *Tenent alvei locum penitiorem.* And yet their hanging together will not ſerve their turn, for the Bees, when they are diſpoſed, will quickly make them part, and depart, when there is no uſe of them, there will bee no room for them. Plin. Nat. hiſt. l. 11. c. 11. Ariſt. de hiſt. Animal. l. 9. c. 40. Mr. Butler.

The Bees breeding, or laying of ſeeds, beginning to ceaſe in ſome

ſome ſooner, in ſome later; and theſe *Amazonian* Dames having conceived for the next year, begin to wax weary of their mates, and to like their room better than their company. It ſeems incredible to ſome, that the honey Bees ſhould receive a prolifical vertue from the Drones, which they ſhould exerciſe eight monchs after, and yet they conſider not, that if a Hen be trodden a day or two, ſome affirm the eggs will be prolifical the year following. And Dr. *Harvey* atteſts the ſame; but yet upon the experience onely of twenty dayes, it is confeſſed, that it is ſufficient for that latter; and *Ariſtotle* ſaith, That generous Hens will lay ſixty eggs, before they ſit, others more; ſo that they will bee ſometimes prolifical two or three months, but afterwards they muſt bee trodden again, or the eggs will bee addle. But to leave this untill wee treat of Waſps, when wee ſhall have a more fit occaſion to handle it.

Hier. Fabricius ab aqua pendente de formatione ovi & pulli.

The Bees having conceived, begin to neglect, nay to moleſt their Mates: At firſt not quite forgetting their old familiarity, they gently give them Tom Drums entertainment; they that will not take that for a warning, but preſume to force in again among them, are more ſhrewdly handled. You may ſometimes ſee a handful or two before a hive, which they had killed within, but the greateſt part flyeth away, and dyeth abroad.

They are but ſhort lived creatures did they live their utmoſt date; for eating much, and being idle, onely in the heat of the day, with a great humming ſound, they flye forth, and fetching a ſhort compaſs or two, having emptied themſelves, and whetted their ſtomachs, they return to feed, and that alwayes of the pureſt honey, whereby they may become ſo foggy, that oft times before the Bees meddle with them, you may ſee hundreds in a day crawl rather than flye out of the Hive, but not able to recover the ſtool again, miſcarry abroad.

And whereas poor ſtocks (I mean ſuch as have few Bees, though otherwiſe well provided) deſpairing of their own continuance, let the Drones alone, not diſturbing, much leſs killing of them, yet not one will out-live *October*.

Some may ask, Is not the male more worthy than the female? How is it then, that the Drones are but vaſſals to the honey Bees? which as they excell the Drones in vertue and

Bedæ axiom.

good-

goodneſs, ſo in power and authority, ruling, and over-ruling them at their pleaſures. Albeit generally among all creatures, the males as moſt worthy, do maſter the females.

And this *Seſoſtratus* King of *Egypt*, who conquered a great part of the world did thus expreſs according to *Herodotus*. If hee overcame any people without contention, or battel, hee made them bear the badge of a woman engraven in their weapons, but if they did fight it out couragiouſly, the cognizance of a man. Yet in theſe, and a few others, the females have the preheminence: And by the Grammarians leave, the Feminine gender is here more worthy than the Maſculine. So in all the kindes of Hawks, the female doth command the male, as being the ſtronger, and the better armed. And the female of the Bear, and the Panthar are more bold and couragious, ſtronger, and of greater ſpirits. Cœlii Calcag. Comment de verborum & rerum ſignificat. Ariſt de hiſt. l. 9 c. 1.

The female Ounce likewiſe, though leſs than the male, yet is more cruel. Jo. Caii hiſt. rarior Animal. Weeker. de ſecret. l. 8.

Ridiculous is the conceit of *Democritus* to catch the Drones. Wet, ſaith hee, the covers of the Hive with water, and in the morning you ſhall finde the Drones buſie ſucking thereof, for feeding of the beſt honey, they are alwayes thirſty; Nay becauſe they feed of the beſt honey, and not *Sandaracha* which is hotter, they are not thirſty; for the Bees all Winter long, while they live, thereof drink not at all.

Timely ridding of the Drones by the Bees, is a good ſigne that they are like to bee forward the next year; becauſe the ſtocks that have caſt often, do beat long with their Drones, although there bee twice ſo many as bee needful for the Bees, that are left, therefore (to ſave the honey which theſe would devour) it is not amiſs to prevent them; and about a fortnight after their laſt ſwarm to diminiſh their numbers, which you may do ſafely in the heat of the day, killing them with your fingers: And the bruiſing of them with your fingers before the Hives mouth, will ſometimes cauſe the females to take the worke out of your hand, and fall upon them themſelves.

Some uſe Drone-pots made of Oziers, the twigs being ſet ſo cloſe, that the Drones, although they go forth, yet cannot eaſily return in again. But the catching this way doth much

trouble; the Bees may sometimes keep out the Queen. And therefore I like not of them.

CHAP. X.

Of the Generation of Bees.

IT hath been an ancient tradition, that Bees have a twofold production, as many other creatures, by generation and putrefaction. About this latter way, *Virgil*, *Cardan*. *Aldrovandus*, and many others have been copious; but whether there bee any solidity in this particular, I am somewhat dubious, because it was never authentically proved to bee performed by any. But they tell us that the best sort is procreated of a corrupted Lion; And therefore say it is no wonder, that being so small creatures they fear not any, nay prevail over the greatest, with a Lion-like courage assaulting them.

Suidæ Historica. A second sort is bred of a Bull, and therefore they are called the daughters of Bulls, because they are bred of their carkasses.

A third sort of a Cow.

A fourth sort of a Calf, but tell us not wherein these kindes differ, for they forgot waking what they dreamed of sleeping.

Would I spend words to no purpose, I might easily for the general, evince the invalidity of this opinion, for in *Brasile*, *Peru*, and most of the new world where are many sorts of Bees, and some in colour and magnitude not differing from ours, there were no such creatures, whereof (if they were lost) they might bee again recovered, before they were transported by the Spaniards.

Mouffet Theatrum Insector. But more absurd is that opinion of others, that of the ashes of Bees bedewed with sweet wine, and exposed to the Sun in a warm place, there will bee a present resurrection of the former burnt Bees.

Dr. Harvey de generat. Animal. exercitat. 130. Perplexed and various are the opinions of the Learned, concerning the generation of Bees.

The first workings of nature are as dark as midnight, and with

with their ſubtlety do not leſs be-fool, and deceive the ſtrongeſt underſtanding than the bodily eye.

Some not comprehending their conception and generation, have fondly delivered that they carried the ſpermatical matter of their original into their hives, gathered out of flowers, and after hatch them, either from the white honey ſuckle, or the reed (or Calamus) or from the Olive becauſe, in yeers abounding with Olives, there are plenty of ſwarms. Not conſidering that the firſt brood is hatched before any of theſe flowers bl ſſome, and that ſome of theſe flowers are not at all in the Northern Regions where is the grea eſt plenty of Bees. Ariſt. de hiſt. l. 5. c. 19.

And for the Olive, *Pliny* denies that they taſte of it, and therefore ſaith, it is better away; and yet hee was ſometime of a contrary opinion. Plin. Nat. hiſt. lib. 21 c. 12. idem. lib. 11. cap. 8.

Cardan denies that they lay eggs, but are bred of honey. This *Scaliger* well oppoſeth, becauſe, ſaith hee, There can bee no generation of honey, for then it ſhould bee the ſeed of the Bee; but this is falſe, neither of honey corrupted, for it corrupts not, but preſerves from putrefaction. Card. de ſubtil. l. 11. Scalig de ſubtil. 151 exer.

Scaliger queſtioning whether Bees did copulate or not, ſaith that of the dew in leaves of plants, worms are produced, and therefore dew opportunely gathered, and fomented with a genital heat of the Bee may be animated into a worm. But the firſt, and chiefeſt breeding of Bees is in the end of *February*, when they ſcarce ſtir forth at all, or not untill the dew be exhaled. And howſoever untill *May*, dews are known to have little efficacy, or excellency, beſides you may viſibly ſee the eggs when they are firſt injected into the cells, they are eggs, and not a dew.

Scaliger, though hee propounded the former opinion, yet held not to it; for whereas *Ariſtotle* delivers it as an opinion of ſome that the Bees bred by copulation, and that the Drones were males, and the honey Bees females; this ſaith hee is falſe (although without reaſon or experience) for the Bees indeed are females, but the Kings are the males: And *Muffet* alſo acknowledgeth no males but the Kings. Scalig Comment in Ariſt. de hiſt. Anim. l. 5 c. 19.

I beleeve, ſaith *Muffet*, they propagate by copulation, and the greater are males (namely in his ſenſe the Queens) and the leſs females, but whether they tread as Cocks hee profeſſeth that he knew not. Muffet in Theatr. Inſect. l. 1. c. 3.

Michael Toxites in Onomaſtico ſuper Theophraſt.

Toxites ſuppoſeth that Bees copulate, and that the Bees are the Males, and the Kings Females: And that the Kings do at certain ſeaſons caſt forth worms in multitudes as flies, their flye-blotes, and that the Drones ſit upon them, and hatch them after the manner of Serpents.

Mr Remnant hiſt. of Bees.

Another ſaith, the matter in which they blow or breed, is ſomething that they gather of the flowers or plants, and bring home, and put into the holes, or cells of the combes, which they mix finely with a little water, and then blow in it a thing leſs then, or as little as a flye-blote. But this cannot bee, for wee finde nothing in the cells wherein the ſeed is injected, but the ſeed it ſelf. And again, the Bees ſeed is much bigger than a flye-blote.

Ariſt de gene. lib. 3. cap. 10.

And as to others, ſo to *Ariſtotle*, the generation of Bees ſeemed very ambiguous and doubtful; for whereas among fiſhes ſome generate without copulation, he ſometimes ſuppoſed the ſame of Bees, and argues thus: They muſt either fetch their young elſe-where, as ſome in his age opinionated, which young muſt be either bred of themſelves, or be produced by ſome other living creature, or they muſt generate them, or partly fetch them, and partly generate them: For ſo ſome ſuppoſed that they fetched onely the Drones, or elſe they muſt generate them by copulation, or without copulation. Thus Bees by copulation among themſelves to breed Bees, Drones to breed Drones, and the Queens to breed Queens. Or all the reſt from one kinde, either from the Queens, the Drones, or the Bees; for ſome, he confeſſeth in his time, held that the Drones were males, and the Bees females: Others held a contrary opinion, that the Bees were males, and the Drones were females.

But againſt all theſe tenets, *Ariſtotles* reaſons as impoſſibilities. If, ſaith he, they breed not, but fetch their young elſe-where, of neceſſity it muſt bee, that there be Bees without any labour of Bees, namely in that place from whence they fetch their ſeed; for why do they come to perfection, being carried away, and not in their own proper places.

And again he ſaith, It agrees not with reaſon that the Bees are females, and the Drones males, becauſe nature never gives females weapons to defend themſelves withall.

Now

Now the Drones are weaponleſs being without ſtings. And on the contrary, it is not reaſonable to imagine that the Bees are males, and the Drones females; for no male are diligent and laborious in educating of their young Cock-pidgeons, and moſt males among birds, ſits part of the day, as well as the female, and as diligently feed their young. Some ſay the Partridge makes two neſts, and the Hen ſits upon one, and the Cock upon another, but they are miſtaken. The males alſo of beaſts of rapine ſeek out, and provide for their young. D. Har. exercitat. 38.

And that ſome Bees ſhould be males, ſome females, is altogether likewiſe improbable, for in all creatures the male differs from the female, externally many fowls differ not, as Crows, Rooks, and many ſmall birds.

And that by generation they ſhould procreate, is as unlikely, becauſe no man ever ſaw it.

At laſt he determines that the Bees are females, but as plants have both ſexes, becauſe the ſex is not to be diſtinguiſhed. But if the Drones are bred without copulation, then alſo keeping the ſame order, the Bees, and their Commanders, are bred without copulation.

He concludes after a long uncertain diſcuſſion of this doubt, That the Kings or Queens Bees breed themſelves, and the Bees. It is neceſſary alſo that the Commanders be procreated by ſome, but neither of the Bees, nor of the Drones, therefore of themſelves.

Now the Commanders cels being laſt made, and but few in number, they breed therefore their own kinde (few according to the cels) and alſo the Bees. And the Bees breed the Drones, and they breed nothing; and ſo the Generation determines in the third number, *Non tamen ſatis adhuc explorata quæ eveniant habemus*; ſo that in all this we have it confeſt; there is much to little purpoſe: The Drones, whatſoever ſome ſay to the contrary, is the Male-Bee, and although he be not ſeen to engender with the Hony-Bee, either abroad as other Inſects do, or in the Hive, which (whatſoever ſome have projected) is unpoſſible, yet without doubt is hee the Male-Bee, by whoſe natural heat, and maſculine vertue, the Hony-Bee which breeds, both Hony-Bees and Drones conceiveth; that they are Males, we have ſufficiently proved in the former Chapter.

In the next place the main Query is, how the *Bees* receive a prolifical power from them.

Albertus Magnus. lib. 26. *Albertus* denies by copulation; but granting the Drones to be Males (which is undeniable) and the Hony-Bees Females.

Arist. de Hist. animal. lib. 5. c. 2 *Aristotle* concludes for it, he saith, *coeunt ea in quibus mas et fœmina est.* Those creatures conceive by copulation where there be Males and Females. And again; they that are bred of the same sort, or kinde, if there be among them Male and Female, *e coitu generantur*, are bred by copulation: And this is asserted by others.

Idem de Hist. animal. lib. 5. c. 1. Geor. Piscatorius. That they engender not together, *Aristotles* Argument is, because there be but few young in their cels; but other Insects that are procreated by copulation ingender long, and hatch quickly: This Reason is frivolous, nay false, for the Bees are numerous in their young (that I say not almost innumerable) and they hatch quickly, sooner than the Wasp. And yet that Wasps are bred by Generation (being *cognatorum generatio*) and not Bees: He attributes it to a defect of Natures bounty towards them, because *nihil ut apum, habent genus divinitatis.*

Arist. de Generat. lib. 3. c. 10

So that according to the Philosophers axiome, and the weakness of his reason to the contrary, they do engender together; but because this is not visible, and therefore perhaps may be denyed by some cavilling Sceptick. I will further shew that the Hony-Bee may have a Masculine vertue from the Drone, otherwise than by copulation. For in the Eele, and the Purple, (a Shel fish whereof Purple comes) is no Sex visible, yet by their slaver, not by copulation do they produce their young, and perpetuate their kinde.

And many other sorts of fishes do not by copulation become fruitful, and generate their kinde; but when they have brought forth, or laid their Eggs, the Male bedews, or sprinkles them with a seminal moisture, whereby they are not addle but prolifical.

Arist. de Hist. animal. l. 6. c 13

Dr. Harvey de generat. animal. exercitat. 40 I have seen, saith Dr. *Harvey*, the Male-Fishes to follow the Females in shoals in breeding-time, that they might sprinkle their new laid Eggs with their Milt, or seed. Thus the Sepia or Cuttle-fish.

There is a Fish called Glanis, in the River *Glanis* in *Hetruria*:

ria: The Female whereof by rubbing her belly on the Males belly is fruitful; and so the Scate and all Fishes with a full tail with the rubbing of their bellies together engender: And so in a word do all fishes, besides broad griſly fishes. Arist. de Hist. lib. 6. c. 13

All Fishes that bring forth Eggs, their copulation is scarcely visible, but without a Male they conceive not, nor any other Creature where there are Males. Vultures saith *Ambrose* conceive without a Male, and generate without conjunction; but *Aldrovandus* on good grounds denies this; and also *Albertus*, who saith, they are often seen to tread. Ambrose hexam l. 5. c. 20. Ulyſ Aldro. Ornithолog. l. 3

When the Bees have conceived, they deliver their seed, not by their tail, but by their mouth, *fætum edunt ore editum ut aiunt quidem*; and this was the cause that some thought that they fetcht it elsewhere from some flowers: *Aristotle* therefore speaking of it, speaks doubtfully ὡς λεγουσιν, for it is a very obscure thing. Arist. de Hist. animal. l. 5. c. 19

And that they blow their seed, our Vulgar expression intimates, for their young is called spar, that which the Bees spit forth, or deliver by their mouthes.

If wee affirm the seed of the Bee to be blown, it cannot so properly be called an Egge, *Aristotle* saith *Aquapendens* was very careful not to call the seed of Insects Eggs, but Worms, yet Dr. *Harvey* cites him, as if he sometimes or promiscuously, called the Worms, Eggs; It is true, hee called the seed of a kinde of Grashopper Eggs, but it was before they were quickned but when they are hatcht, hee calls them no longer Eggs, but worms: Although indeed they may seem when they have done feeding, and are inclosed in their cases to be amalogous eggs, but not while they feed; and therefore *Aristotle* saith, Every kinde of worm when it hath attained his full end, and perfect magnitude, is as it were an egge, for the shell hardens, and for a time it stirs not, which, saith he, is apparent in the worms of Bees, Wasps, and Caterpillars. Aquapen. de formatione ovi & Pulli. p. 19 Arist. de Hist. lib. 5. c. 29, 30 Dr. Har. de generat. animal. exercitat. 61 Arist. de gener. l. 3 c. 9.

But the Philosopher enumerated too fast: Of Caterpillars it is true, and of all others that have proper, or natural cases, but such as have adventitious, as Bees, and Waspes, never harden.

An egg properly is that, out of a part whereof a living creature is produced, and the residue is meat for it, improperly that

Aqua pend. that is an egg out of the whole whereof, a living creature is bred, as the eggs of Spiders, Ants, Flies.

Ariſt. de gen. lib. 2. c. 1. Inſects firſt breed a worm (although it be not yet a worm untill it be hatched, but indeed rather an egg) and this after a ſpace of time is a kind of egg, for the Aurelia hath the faculty of an egg, and a living creature is bred of it, receiving in the third nutrition, the end of generation.

Mr. Butler, Mr. Levit, Mr. Remnant. That the Bees blow as a Flye or Waſp, is affirmed by ſome. And as the blotes of the flyes are nouriſhed by the fleſh wherein they are blown, and by the earth wherein they are bred, ſo the ſpat or brood of the Bees, ſaith Mr. *Levit*, are nouriſhed by honey and water; but of this in his place.

The Bees ſeed is white, about the bigneſs of a Butterflies, not round, but oblong, which they lay cloſe under the honey-combes. In the middle of the bottome of the void cells

Mr. Butler round like a ring, ſaith Mr. *Butler*, but although he was a great obſerver, yet for want of obſerving himſelf, and following, as he ſuppoſed *Ariſtotle*, he was miſtaken in *Theod. Gazas* tranſ-

T. Gaza lation, who renders the word, πλάγιον by *obliquus*, which *Scaliger* well reads *ad latus*.

The Bees ſeed firſt ſticks to the ſide of the cell, ſaith *Ariſtotle, ad latus jacet*, alwayes (as I remember) at an angle,

Ariſt. de h. ſt. Animal. l. 5. c. 19. ſome diſtance from the bottome, and ſo doth the Waſp lay her ſeed, and not cloſe to the bottome; thus it ſticks with one end, and with the other end bends ſlope-wiſe towards the middle of the cell.

And after it is hatched, it lyes a while croſs, or ſide-wayes, with the mouth ſomewhat erected, and grows ſo long as the matter of augmentation continues, which is not long, and then it falls to the bottome, and raiſeth it ſelf up that it may be fed. It will raiſe it ſelf up, and ſink as it were within it ſelf by contraction when it pleaſeth; for though it have not feet, yet the skin is ſomewhat ſcabrous whereby it reuls, or moves it ſelf higher, or lower within the cell.

The Bees in their breeding diſcend by degrees towards the nether part of the combs, filling one cell after another: But when their chief breeding is paſt, they do not preciſely obſerve this order, but lay up their food promiſcuouſly among the young Bees, where they find the cells empty.

Firſt,

First, The seed sticks to an angle above the bottome, when it is hatched, it falls after a little space to the bottome, but cannot come forth to take food, which yet *Aristotle* seems to grant to be necessary: First, he saith, It is nourished, but tells not how: Secondly, he saith, over against the cells, where the young are bred, the hony is laid up, he tells us not wherefore.

But *Scaliger* saith, That the young may eat thereof, *ut Accumbenti cibus opponatur*, supposing, as he professeth, a few words before that, the worms and hony were both together in one cell, for he rationally concluded, they could not live and grow without food, they were not *locomotive*, and therefore could not go forth of their cells for it. How therefore they should receive it, was the great mystery. He supposeth the worms to stick fast on one side of the cell, and the hony on the other, that with bowing of their bodies, they might feed themselves. The worm, saith he, sticks so fast to the side, as if she were glewed or rivited there, but by no means at the bottome, lest she should be drowned with the hony. And this supposition of the worm and the hony being together in the same cell, made him conceive the worm smaller than the Bee; for saith he of the seed is generated a worm, which worm is alwayes less than the Bee; but this is not so, for the grown worm is every way as great, and as large as the Bee. Scalig. Comment. in Arist. de hist. l. 5. c. 19

But neither of the former opinions are true ordinarily, for the Bees are bred usually in the combs before, or in the lower part of the other combs, the hony (if there be any) being reposited in the backward combs, and the upper parts of the other. It is true indeed, that the Bee-bread is oft laid up in the void cells, among the breeding cells; not that the young may feed themselves, but that therewith being ready, and near at hand they may be fed by the Bees.

The seed is never visible in Bee or Wasp, that I could discern upon diffections of many in one part or other.

Cardan affirms that they cannot have eggs within them, and be exercised in their continual labours, because neither Silk-worm, nor Grashopper as long as they flye, have none; suppose the assertion true, that they have not eggs within them (but blow their seed which I beleeve) yet is this instance and Cardan. de subtil. l. 11.

reason very weak. *Scaliger* answering him, justly denies what he saith, but contradicts not his instance, onely saying, That they that are well versed in natures secrets can determine this; whereas it is well known, that the Silk-worms when they have wound up themselves into their bottomes after twelve or fourteen dayes eat themselves out a winged creature, but have little lust to flye presently for fulfilling their lust, and ergendring together: Whereby the male having spent himself falls down, and dies, and the female also as soon as she hath laid her eggs, which is not long after.

As for the Grashoppers, they will flye nimbly with eighty, nay one hundred eggs in them as big as the eggs of Pismires, and the claw-tailed Humble-Bee (of which afterwards) works as diligently, and flyes as deliverly when she is great with young, as when she is barren.

Fabric ab Aquapend. exer.

Fabricius concurs with *Cardan*, and therefore renders this as a reason why some creatures lay eggs, and bring not forth living creatures, because if they were detained in their bodies untill they were hatched, with their weight they would hinder their flying: It is true, if many were animated within them at once, it might be so, otherwise not, as is manifest by the former example.

Scaliger de subtil. exer. 391.

And that it is possible for Bees to flye with eggs, *Scaliger* makes good by these following instances: Hee took a Glow-worm engendering with a female, and put them all night into a box with a hole in it. The male continued at his work next day, and at noon giving over, dyes; from that hour untill evening the female laid many eggs which were hatched in twenty hours, and presently went their way; so that some Insects speedily hatch, and perfect their eggs.

Therefore he concludes Bees may copulate in a few hours, and presently lay their eggs.

Likewise he relates, that when he was a stripling, that he took of the greater sort of flies, one marked with white strakes, and holding it some while in the hollow of his hand, being delighted with the shape, it brought forth many white worms notable for their motion. And therefore as thee carried worms, so may Bees eggs when they flye.

But the Flesh-flye, Butter-flye, and many other Insects with-

without all controverſie flye about with their eggs in them. Now *Scaliger* at laſt diſcovered his little experience in the nature of Bees, when thinking to anſwer more fully, hee mars all: For whereas *Cardan* ſaith truly, they are in continual labour, hee denies it, and affirms, that the Bees having gotten honey by labour, they take the benefit of it without any more working: Whereas it is certain, that they never give over working (the ſeaſon being fitting) as long as there is any thing to gather, and they give over breeding, before they give over working.

The ſeed being hatched lives, and excerns excrements. All Inſects firſt make a worm, except a certain ſort of Butter-flye, which produceth a certain hard thing, like wilde-ſaffron ſeed, but fluid within.

Now the generation of Inſects in theſe worms, is not cauſed in ſome part onely, as that ſome part of the egg, turns to the formation, the reſt to the nouriſhment, but the whole alters untill it attain the juſt and due proportion.

Creatures which produce a worm firſt, bring forth a ſmall one, which is increaſed by it ſelf, without any addition, as meal by leaven is made of a little maſs a greater. Ariſt. de generat. l. 3. c. 4.

And again, ſome creatures have this property in themſelves, that they have an increaſe for themſelves, as the worms of Bees, others gather it abroad, as the worms of Butterflies, called Caterpillars. Idem de generat. l. 3. c. 9.

This is, if at all, but partly true; for after they are hatched, there is a ſmall augmentation from the ſeminal vertue; but as ſoon as they are capable of food, they muſt have it, or elſe after three or four dayes they will dye, as I have often experimented; whereas when they have done feeding, and are ſhut up with their waxen covers, they will (though out of the Hive) live, and come to perfection, but will bee perhaps longer in their Metamorphoſis, than if they were continued in it. I have had ſome three weeks before they have eaten themſelves out.

Creatures ſhaped without the females womb have in the egge, as well matter of nouriſhment as matter of generation of the body, becauſe after the egg is laid, and ſevered from the body (of the Hen, or other creature) it hath no more nouriſhment from the Hen, but onely a quickning heat when thee ſits, but as ſoon as the chicken is diſcloſed, there is not much

longer any matter of nouriſhment, but it muſt receive it elſewhere.

Ariſtotle acknowledgeth that they void excrements, and can there bee excrements without a ſupply of food, or a mutiplication of a little ſeed above a hundred fold by the ſeminal vertue, or ambient aire, eſpecially where the excrement are four times ſo much as the ſeed, or egge was at the beginning; yet *Aldrovandus* concurs with *Ariſtotle*, ſayirg, That the worms of Bees and Waſps have within them that which is the matter of their augmentation; the contrary whereof is evident, for if the Hives be not provided before hand, or ſupplied daily with food in ſtormy and unſeaſonable weather, the young brood will dye in the cells, and you may ſee the old ones carry them out in abundance upon the firſt change of the weather, and then breed again.

Often towards the end of Summer, if hony-gathering bee not plentiful, they will draw out the young unfledge Cephens, and ſometimes (though rarely) the Nymphs, leſt for want of ſufficient meat they ſhould all ſtarve together.

Fiſhes produced of eggs (as almoſt all are) either within the females, or without them, at firſt receive no meat, *ſed creſcunt hauſto ovi humore*, but afterwards are nouriſhed when they grow with the river water.

Dr. Har. de gen. animal. exer. 44. In the generation of Animals which are procreated by an after addition of parts (as the chicken in the egge) there is not to bee ſought another matter, out of which that which is to bee produced, is to receive the ſhape of a body, and another out of which it is made, nouriſhed, and increaſed. But here in the eggs of Inſects, it is otherwiſe, becauſe they are not at firſt perfect, and therefore muſt have an increaſe, and augmentation elſewhere, untill they attain their juſt magnitude.

Harvey de gen. exer. 62. The eggs or worms of Inſects have from without them that whereby they increaſe. But how they have it, is a riddle. Seeds of herbs, as Beans, &c. attract by their huſks, or ſhells the moiſture of the ground, which they ſuck in like ſpunges, and are therewith nouriſhed as well as if they received the ſame by veines. But thus the worms in the combs cannot bee fed, the meat being remote from them.

Idem exercitat. 9.

Idem exer. 65. The Bees vomit forth the honey which they have gathered and

and digested in their bellies, and lay it up in their Hives, and after the same sort the Hornets, and the Wasps nourish their young. The assertion is not true, or very ambiguous and imperfect. If hee understands that the Hornets and Wasps empty into their cells what they collect, and gather, then is it not true, for they lay up nothing that ever I could finde. If it bee understood that they feed their young with what they gather, as also the Bees, with what they gather, and also with that which they have formerly injected into their combs, when the weather will not permit them to gather abroad, than it is a truth, but darkly, and imperfectly delivered.

So then wee see after that they are disclosed, they must have meat; out of their cells they cannot come, nor creep, they are not *locomative*, like Caterpillers.

Now the main Query is, how they should have it? And the ignorance of this caused *Aristotle*, and others to deny, that they received any, so that from the history of their being a worm, to their metamorphosis into a Bee, wee hear of nothing.

Concerning this, I was long without satisfaction, and finding that it was impossible to observe the particulars among the Bees, because of their numbers and closeness, I sought to finde it out by observation in other Insects of somewhat differing, yet of a like nature, in many particulars. I considered that yearly in my empty Hives there bred Hornets, I took notice therefore daily of the progress and order of their work, and generation, which I found to bee thus:

The Hornets neast is begun by one mother, or breeding-hornet at the first, which in the top of an empty hive wrought a very short little drossie pendant peg or pin, about the bigness of the tag of a point of the outer dry parings of pales, or other old timber with a mixture of a gummy liquor that flows from oaks principally (of which matter are all her combs framed) this short peg shee made the foundation and center of a Canopy, or Tent like to a half globe, in the center of which with in, she worketh six or seven hexangle cells, all concurring and meeting together in the center, but all jutting out on each side downward, and having wrought them half their depth to an angle of every cell somewhat above the bottome, shee injecteth into each a several seed, and then on the out-side of those

cells begins six, or seven more, but all cocentring in the same point with the former; and when they are wrought half their depth, shee injecteth into each a particular seed; but before this is done and finished, shee quickens and hatcheth the former, encompassing with her body, or lying round like a ring about the pin that is the center of the globous depending Tent, or Canopy, but in the inside of it, that her heat may equally transmit it self to each cell, and enliven every seed.

Within a few dayes thus receive they life, and begin to stir, at first sticking at the taile end, and then falling to the bottome, do they raise themselves upward. Now the mother sometimes sits upon, or rather about them, and the latter brood also to hatch and comfort them, and sometimes goes abroad and fetcheth food for them, and giveth it them as a bird her young, with her mouth going from one to another: And as they grow shee worketh the cells deeper, untill they attain their perfect growth, which will bee above three weeks, and then the first brood begin to bee torpid and dull, and receive no more food, which when they refuse, shee worketh a cover over them, whiter than the combs, and they so continue shut up about three weeks, and being transchanged from a worm to a Hornet, eat of the cover, and come forth, and work, and breed their kinde, but then being many, in broad combs.

And as they are fed, so also I am confident are the Bees, although they come to their perfection in a shorter space: For they also after they have fed about eighteen dayes, and attained their growth, are shut up by the Bees, with a waxen cover, and continue so about the like space wherein they are metamorphosed, and eating the cover before them, lift up the rest with their head, and come forth winged creatures.

Arist. de gen. Animal. l. 3. c. 9

Of this metamorphosis of Insects, *Aristotle* thus; Every imperfect conception produceth first a worm, which is afterwards perfected by a change and metamorphosis, and becomes a living creature.

Dr. Harvey de generat. Anim. exercitat. 44. 56.

In the generation of Animals formed and transfigured of a matter prepared and provided before-hand, and all the parts begin to appear, and are distinguished together by a metamorphosis, and a perfect creature is brought forth: But some, one part or member being made before another of the same

ſame matter, afterwards are together nouriſhed, augmented, and formed.

The frame of thoſe begins from ſome one part as the original, and by the help thereof, the other members are added and joyned together; and theſe wee ſay are done by a Epigeneſis, or after addition of parts, namely, by degrees, part after part, and in reſpect of the other, properly is called generation.

After the firſt ſort is the generation of Inſects, where the worm by a metamorphoſis is bred of an egge, or the beginnings are procreated of a corrupting matter (the moiſt drying, or the dry moiſtening) of which as of a Caterpillar grown to a perfect magnitude, by a metamorphoſis a Butterflye appears in the juſt magnitude. Give mee leave to vary from ſo learned an Author, and diligent obſerver.

It is a truth that there is no metamorphiſed creature, and addition of a new matter or magnitude, yet in many there is a diminution for thoſe that have not adventitious caſes, or covers, as Bees, Hornets, and Waſps, but natural hardened ſhells or covers, as Caterpillars, &c. have ſo much (as the ſhells or covers) ſubtracted from the being and ſubſtance of the future Butterflyes.

And this alſo holds not that all the parts begin to appear, and are diſtinguiſhed together for the change and metamorphoſis of Inſects is not altogether, but by degrees, part after part is changed, and altered, as wee will further make appear in the particulars.

The alteration of Inſects in ſome is made of the whole, as Bees, they having no membranous skins or ſhells about them, but the cells of the combs, and not of any parts of it: But every ſuch kinde of worm, when it hath accompliſhed his magnitude and greatneſs, is made as it were an egg, for the skin hardens, and all that time it is immovable from its place, yet moves in its skin, cell, or ſhell, as is viſibly evident, for touch the out-ſide and they will contract, and ſtir.

Now the cauſe hereof is, becauſe nature haſtens, and before it bee a perfect egg, brings forth ſo, that the worm by degrees, grows to the bigneſs of a ſoft egg, and after in ſeaſon, eats through the cover or ſhell (for they are not repoſited in cells

Ariſt de gen. lib. 3. cap. 9.

as Bees) and comes forth as a chicken out of an egg being perfected in the third generation. Their metamorphoſis is their perfection, and yet ſome groundleſly have delivered the contrary. Wonderful, ſaith one, are the metamorphoſes of ſome creatures, for Caterpillars getting wings degenerate into a Butterflye.

Mizaldus memorabil. cen. 2. 60.

Mr. Butler Feminine Mon. c. 4.

The worm being now dead, preſently the alteration begins from a worm to a Bee which is twofold in ſhape, and in colour. The firſt alteration in ſhape is the diviſion in the middle; then the other diviſion between the head and ſhoulders, Thus Mr. *Butler*. But it is otherwiſe, for the tranſmutation as in a Waſp, begins to be firſt viſible in the ſuperiour part, and the eyes are firſt diſcerned, and then the inciſion between the head and the ſhoulders, which yet as it grows more perfect, becomes ſmaller, the middle inciſion or diviſion is ſcarcely viſible, when the eyes may bee ſeen, then the legs, and the horns begin to bee framed, and the wings are laſt finiſhed.

When they are perfect they thruſt up the covers over their heads, which hang at their backs till they come forth, their fangs and tongue hang down on their breaſt, but when they are come forth, they then contract them (untill they have occaſion of their uſe) and draw them up cloſe bending under their throats, that they are ſcarcely viſible, but when they eat or work; their colour is at the firſt aſh colour, and ſo are their wings, but in a little ſpace they convert to a dark brown untill they grow old, when they become gray.

Ariſt. de hiſt. l. 6. c. 1.

And thus it is in many other creatures. Fiſhes procreated of eggs, have their eyes apparently great, and oblong, contrary to thoſe creatures which are bred of worms, where the head and eyes are laſt. But hee was deceived, for in the metamorphoſis of flying Inſects, the alteration begins at the head, and is firſt viſible in the eyes.

As in dry weather Bees gather moſt honey, ſuppoſe it with moderation, for immoderate drought (as in the year 1652.) withers away the flowers; ſo moiſt weather produceth ſtore of Bees, ſuppoſe it ſtill with moderation, for otherwiſe (as in the year 1648.) the perpetual raines waſhed away all the ſubſtance of the flowers, that not onely the ſwarms, but old ſtocks generally dyed. I loſt above half a hundred, 1648. for my ſhare.

Now

Now the reaſon why moiſt weather produceth ſtore of Bees, is becauſe the Bees do ſpat and breed the faſter, and preſerve and nouriſh their brood the better by the moiſture that falleth in thoſe times, which in dry weather they cannot ſo well get, or rather approve not ſo well of, for after a warm rain, you may ſee them drinking on every herb, you can hardly ſet your foot on the ground or graſs near the Hives, but you muſt tread on them, and that when their water is juſt by.

Too much fair weather is deſtructive to the increaſe of Bees, for going forth every day to gather, they are therewith wearied, and neglect breeding, and ſo though they leave fat ſtalls, yet in a ſhort time few Hives, and therefore *Columella* adviſeth to ſtop them in, every third day, that they may attend to breeding. Colum. lib. 9.

The Bees breed beſt, ſaith *Ariſtotle*, when they gather moſt honey, but herein hee was deceived, for they gather moſt honey, according to his own poſition when the honey dews fall, which ſaith hee, is not *ante vergiliarum ortum*. But wee have often ſwarms, a firſt, and a ſecond alſo out of the ſame Hive before that time: And generally all good Hives are well furniſhed with young before that time of the year. Indeed hony is not the ordinary food for the Nymphs, but Bee-bread, which from Mid-March, and in ſome temperate Springs from Mid-February, they plentifully gather. Ariſtot. de hiſt. Animal. l. 5. c. 19.

CHAP. XI.

Of the Hives, and ordering them.

NOw having at laſt, though not without trouble and travel delivered our Bees, and brought them into the world, it is high time to provide them a houſe, and a fitting ſtation, which when I have done, with as much brevity as may bee: I will entertain the Reader for his pains, and patience with a collation of ſweet meats.

They have Hives of ſeveral ſhapes and matter, in ſeveral, and divers Countries, ſome of Ozier, ſome of Barks, ſome of Trees hollowed (and this ſort the *Americans* about *Mexico* uſe) ſome of ſquare boards, three foot high, and a foot broad; Petrus Cref. cens. lib. 9. c. 05.

so in scarcity of Hives, I have known some use Butter-firkins: Some of earth, which they daub with Cow-dung within, and without, because the smoothness is offensive, and the heat and cold also otherwise would bee too extream.

Plin. hist. l. 21. c. 14. *Pliny* saith, The best Hives are made of barks of trees; a second sort of Rods, and a third sort of Wickers.

Each Country almost hath his several fashion, as well for the matter whereof they are made, as also for the manner and form of their making. In our Country, the Hives principally in use, are either made of wickers, or of straw.

The wicker Hives, if they bee not often repaired, will bee at a fault, and lye open unto Wasps, Robbers, Mise; any of these if shee findes but a crack, or crany, will dig her way in. And the Mouse, unless the twigs bee close wrought, although shee finde none.

The straw Hives when they are old and loaded, do usually sinke on the one side (especially if they take wet) and so break the combs, and let out the hony. Yet I have divers which have been continually used above twenty years together, and never lost spoonful of hony out of them. Hives made of the fashion of a Bell, which they use in *Northfolke*, are not so subject to sinking, but being generally large, they are not fit for single castlings; and besides they are colder than the globous Hives.

All things considered, the straw Hives are the best; and the Bees do best defend themselves from cold when they hang round together in manner of a Sphear or Globe, and therefore the nearer the Hives come to the fashion thereof, the warmer and safer they bee; but of necessity the bottome must bee broad, for the upright and sure standing of the Hive, and for the better taking out of the combs, and the top must rise three or four inches higher than the just form of a globe, whether they bee covered with hackles or not, because they delight to hang in a cone, and work from a point; but chiefly to prevent sinking when they are full of honey, or young Bees, to which the bread crowned Hives are generally subject.

So then that Hive hath the best shape that is likest to an egg, with one end cut off, as wee usually order it when wee eat it. It may consist of twelve strawn wreaths or rowls, or

or more, according to the bigneſs of the Hive.

Let the three firſt rowls bee of one magnitude, and compaſs, and about a foot or ſomewhat more in the Diameter, the four next above them more large, bellying out a little each beyond his fellow that the combes may bee more firmly faſtened: Let the other five by little and little bee narrowed to the center at the top that it may bee pyramidal.

And after this proportion, if the Hive conſiſts of more wreaths or rowls, for this is the ſhape of a ſmall Hive. I have ſome conſiſting of ſeventeen or eighteen wreaths.

Hives are to bee made of any ſize between a buſhel and half a buſhel, ſaith Mr. *Butler*. I have many Hives containing five pecks which ſwarm yearly, and laſt (by ſucceſſion) longer than thoſe that are hived in ſmall Hives: And although a half buſhel Hive will contain a competent ſtock, yet the ſwarms for the moſt part are ſmall, and the caſtlings of themſelves worth nothing; and the Bees that are ordinarily left when they have caſt twice are ſo few, that they quickly miſcarry.

However let your Hives bee rather too little, than too great, for ſuch are hurtful to the increaſe and proſperity of Bees. If the Hives bee too great, the Bees will bee more lazy, working uncomfortably, becauſe they deſpair ever to finiſh and furniſh their houſe; but yet if there bee a competent number of Bees, they will work induſtriouſly (though the vacuity bee large) and compleat as much with combes as ſhall bee ſufficient for them. But an over large Hive is prejudicial to their ſwarming.

When you have provided your Hive, clip off, and cut away all the ſtaring ſtraws in the inſide, and make it as ſmooth as you can. The beſt and readieſt way to perform it, is this: Firſt wet the skirts of you Hive, then hold it a turn or two over a blaze of ſtraw, and then take it off, do it a ſecond time, and if need bee a third; and after rub it with a peece of a rubbing ſtone, ſuch as Mowers uſe to whet their ſi hes withall. And ſo ſhall you much eaſe the Bees, they wil. do it themſelves in time, but not without much pains and labour, wh.ch might bee more profitably imployed. Howſoever when you have trimmed it as well as you can, yet ſhall ou hear them if you liſten in an evening harping like Miſe (as if Miſe were gnawing on

every side) and that for divers nights together.

And if it bee an old Hive, though it were musty, yet holding it over a fire several times, will sweeten it. And the Bees will better like in such a Hive so ordered, than in a new one, not purged with the fire.

Mr. Southern. Mr. *Southern*, and others after him advise, that if Bees finde fault with a Hive, and will not continue in it, to pull out the spleats, and put into it a little quantity of Barly, Pease, or Mault, and let a Hog, eat it out of the Hive, turning the Hive with your hand as hee eats, that the slaver or froth hee makes may remain in the Hive, and then wipe it lightly with a cloath, and having put in your spleats again, hive your Bees in it, and they will undoubtedly tarry. I never had occasion to experiment it, because that I never had swarm that I could not make to tarry in one Hive, or other.

Many rub their Hives before they use them with fennel, or other sweet herbs, and sprinkle them also with Honey and Beer mingled together, Sweet-wort, Milk, or some other sweet liquor, but I seldome use it, but onely as I said before, purifie and sweeten them with fire; and perhaps set them, before they bee used, open in the aire a few dayes out of the danger of rain.

I have scarce (in forty swarms, and more that I have had in a year) hived one twice, or had any return after that they have been hived, except when the Queen Bee hath been wanting.

Having prepared and dressed your Hives, the next thing that you are to do is to stick them. And various are the fashions that are observed, some doing it one way, some another, Mr. *Levit* prescribes this course. Take a stick of Sallow, or Hasel, about the bignes of a mans thumb, let it bee a foot long, or somewhat more, then cleave it cross-wise from one end till you come within a handfull of the other end; and no further, then bend each quarter a several way, cutting off the sharp edges in the midst of every one of them, then may you put the end that is not cleft into the crown of the Hive, and bending every of them a several way, stick them into the side of the Hive, that they may force the upper unclest end hard to the crown of the Hive; but if the Hive have a little hole in the crown (as many straw-

Mr. Levit ordering of Bees.

straw Hives have) then cut the upper end of your said crown-tree where it is not cleft small enough to go through a little way, leaving a shoulder on the inside to stay it: And this is to keep the crown of the Hive from sagging down-wards as they wil do (except your Hives bee exceeding good) when they are heavy laden with hony.

Lastly, Take a small stick and cleave it clean through in the midst, cutting both the parts flat and smooth, and put them cross-wise into the Hive within four fingers of the board they shall stand upon.

But this inconvenience I finde in this manner of sticking, that they cannot bee taken out, but altogether, and therefore the combes will bee much broken, and the honey run out when you take a Hive.

This course I observe; I take a willow stick, about nine, or ten inches long, and (according to the greatness) cleave it into several thin peeces, each spleat I shave till it will bow, then sharpning both the ends; I stick three such spleats in the center of the crown of the Hive, and bow the three other ends to the sides of the Hive (that they stand like so many bows) and there enter them in a triangle. And then after put a strong spleat quite through the middle of the Hive within four inches of the bottome. If it bee a large Hive, I put another cross that (otherwise not) about an inch lower.

That the Hives should have holes quite through them to prevent Spiders webs, or by the wind passing through to blow away any offentive matter, is an idle fancy, yet prescribed by *Florentinus*. Florentinus.

CHAP. XII.

Of Seats for the Hives, and the Bee-garden.

LEt your Bees bee seated not far from your house out of the danger of an eccho; not too hot in Summer, nor in too shady a place in Winter. This counsel may bee profitable to some, but it is of little worth to us where the hottest Sun in Summer if they bee well defended with covers, or a Penthouse Columella.

hurts them nothing, and the greateſt froſt in Winter (ſuppoſing them covered above, and alſo well ſtopt below) damnifies them nothing. Nay, I have found experimentally that in a row of Hives ſtanding on the North ſide of a long Barn, whoſe height hath intercepted the Suns beams all the Winter, leſs proviſion (almoſt by half) hath ſerved thoſe Hives than would have ſerved others ſtanding alwayes open to the Sun, for coming ſeldome forth they did eat little, and yet in the Spring were as forward to work, and to ſwarm, as thoſe that had twice as much hony (otherwiſe alike) in the Autumn before.

Some Bees will bee late at their work after Sun-ſet, and if when they return they finde it dark about the hive, they muſt lye abroad, if not altogether periſh. Let the door therefore bee ſomewhat to the Weſt.

Let your Bee-garden bee well fenced from Cattel, and as well as may bee defended from winds, eſpecially let them be ſecured from the Weſt and South-weſt winds, which are with us moſt conſtant in the Summer. The time of Bees labouring, *Virgil* thus preſcribes,

Virgil Georg. lib. 4.

Firſt for your Hives a fitting ſtation find
Sheltered from winds rough violence, for Wind
hinders their carriage ---

Mr. *Butler* would have them defended from the riſing Sun, becauſe it invites them to work when the aire is chilly and cold. Suppoſe there were ſuch an inconvenience, which yet I never found, yet where there were many hives, a fenſe on the Eaſt ſide could not defend many if any at all. And if they ſtand on benches with backs or walls behinde them, and a Penthouſe over them, they will bee at work in a fair day two or three hours before the Sun can ſhine upon them.

And for ſwarms, it is beſt to uncover them on the firſt ſhining of the Sun upon them the day after they are ſet up (till they know their ſtation) that they may bee allured forth by the heat thereof, yet when the Sun ſhines hot at noon, let them bee ſleightly covered.

Columella preſcribes that the hives ſtand with their mouths ſomewhat to the Eaſt, that the Sun may ſhine on them in the morn-

morning, and make them more early to follow their work; but upon experience, I commend the setting of them somewhat to the West, that (being late often at their work) they may have more light (their eyes being weak) to enter their Hives, and also that they be not prejudiced with the Easterly winds, which are cold and hurtful.

Let their entrance be low (because of the Mouse) but longer in Summer, and shorter in Winter, but in Autumn shortest of all, not having passage for above a Bee or two at once, to prevent the danger of robbing both by Bees and Waspes.

Some prefer single stooles as not subject to diverse inconveniences, which Bees standing on benches (as they imagine) are liable to, they are kept saith M^r. *Levit* by Penthouses from the raine, but neither from the heat of Summer, nor cold of Winter, for they stand naked, the heat or cold easily takes hold of them, especially any great and long frost.

Againe, the Wind many times makes a great noyse in the hollowness of those kind of houses, which sore annoyeth the Bees; Mr. *Butler* saith, that many stalles upon a bench in Summer may cause the Bees to fight, as having easie access on foot to each other.

And againe, standing so near, they some time mistake the next Hive for their owne; and againe, in Winter the benches will bee alwayes wet, which looseth the cloome, rotteth the bottom of the Hive, and offendeth the Bees; and lastly, the *Mouse* at all times hath free passage from one to another without fear.

I have tried both wayes, and found none of these evils that are objected, in setting Bees under a penthouse, and whereas in the first place it is urged, That they are always subject to Heats, and Colds; I answer, that if any are much offended with either of these extreams, they are the Hives that stand on single stools where the Sun penetrates, sometimes through the hackle and the cold winds every way pierce them; and in the Spring, when they begin to work, will blow many of the Bees from their Hives when they would enter in.

And for the noyse that is occasioned by the Winds to Hives under a penthouse, it is less loud and violent than where it hath an open passage on all quarters; but they are more apt to fight on benches than on single stooles. In many years observation,

having

having more Hives upon benches than ever I knew any to have on ſingle ſtooles, I never had any robbed by his next neighbour, but moſt commonly (if at all) by ſome of another Bee-fold; and whereas it is objected, that in Winter the benches will bee always wet, I anſwer, that this objection is altogether frivolous, nay falſe, for the ſame cauſe ſhall wet the ſingle ſtooles that will wet the benches under covers; nay, they are much more ſubject to it, for only a driving raine from the South can wet a little at moſt before the entrance, which the Sun or Wind will quickly dry when as they are liable to wet on every ſide; and for the Mouſe, ſhe will more ſecurely viſit them where ſhe may unſeen (getting under the hackle) eate her way into the Hive, Mr. *Lawſon* therefore commends a penthouſe.

Mr. Lawſon new Orchard.

But if any delight in ſingle ſtooles, let them be of wood rather than of ſtone, for they are too hot in Summer, and which is worſe, too cold in Winter; be careful that they be well covered with hackles, which you muſt often take off, both to dry the Hives in a Sunny day, and alſo for fear of Miſe and Spiders.

And whereas it is objected, that Bees ſtanding on benches are apt to miſtake their Hives, eſpecially the young ones; and if a Swarme return home they will ſettle upon the next Hives, to their owne and others ruine, and thereby occaſion a great loſs of Bees; to prevent this, let them ſtand half a foot at the leaſt between Hive and Hive (it were beſt a foot) and theſe miſcarriages would be avoyded, and to ſecure you from Miſe, keep a Trap conſtantly on every Bee board.

Take notice of ſome advantages that this way you may enjoy, which you cannot ſo well when they ſtand on ſingle ſtools; oftentimes a poor Hive ſtanding by a full neighbour, if they lye out, and the weather be not fitting to ſwarme, they will (as it were) make a League of amity with them, and firſt growing familiar, will with their ſupernumerary Bees (all not being able to work in the full Hive) repleniſh their neighbour with bread and meat, whereby they will ſwarme almoſt as ſoon as the beſt, which otherwiſe would not have ſwarmed that year, or very late.

But beſides (which is more conſiderable) you may have much pure Honey without any trouble, or loſs; about midde

April

April in a warme Spring, obſerve what Hives are full, and begin to lye out, and ſet a Hive with the Combes that the Bees dyed out of the Winter immediatly before, next to ſuch a full Hive, and you ſhall have them work into it preſently, and carry in abundance of Honey; of neceſſity many of them muſt have been idle in their owne Hive, there being no roome for half to work; they take this as a retiring houſe which they will work in, and ſtay in too, night and day, only keeping an intercourſe with their owne, which will ſwarme never the later, and as ſoon as by the emiſſion of a Colony there is roome made in their own Hive, they will goe againe to their Leader and leave their proviſion; if ſome few ſtay when you take it, knock them out, and they will returne to their old habitation; I had this laſt year, one thouſand ſix hundred fifty ſix, in four ſuch By-hives thus gathered, in eight dayes before the end of *April* neere four gallons of Honey, and the Hives alſo ſwarmed in *April*; this Honey was pure Virgin Honey, as white almoſt as milk.

But if they ſtand a week in *May* and ſwarme not, then take the retiring Hive and carry it ſome diſtance from the ſtoole, and knock it on the crown and ſides, and they will all goe out to their owne Hive. But if you dare not venter on this courſe, then drive them into an empty Hive, and the day following knock them out neer their owne Stock, and they will quickly return into it. By this, conjecture how much honey Bees gather in the Spring, but of this more afterwards, ſo that it is neither for want of roome, or ſtooles, or wit (as ſome imagine) to ſet Hives on benches under a penthouſe.

Mr. *Butler* deſignes to ſet ſixty three Hives of Bees in a plot of ground of fifty foot ſquare (if any, ſaith he, be ſo happy to attaine this number, which I have much exceeded) but I would rather adviſe to ſet your Hives if you have many, at a larger diſtance, if you have roome, whether upon ſingle ſtooles, or upon benches, namely, not above ſixteen, or at moſt twenty in a row (ſtill take notice to ſet them from Eaſt to Weſt) and three or four rodds to the Southward, another row, and ſo according to your numbers, or at double that diſtance if you have roome enough, for it cannot otherwiſe but often fall out, that you ſhall have many ſwarmes riſe together, or before you ſhall have Hived the firſt, eſpecially in a plentiful year, to your no little diſturbance,

and prejudice: Whereas ſtanding at that diſtance, you ſhall more frequently prevent it; and the more, if you have a row of trees planted thick to the Southwards of every row of hives, ſome two or three rods diſtant, where they will readily light and ſeek no further.

Another inconvenience of many hives ſtanding upon ſingle ſtools one before another is, that ſometimes the ſwarms will ſettle on the hackles of the hives before them, and if you bee not preſent, and ſpeedily hive them, hazzard the loſs of the ſwarm, and perhaps the ſtock too, as I have found by experience.

Let the ground before your ſtools or benches, for a rod or two at leaſt, bee kept ſhort with often mowing, for long graſs and weeds, much more Beans and Peaſe are prejudicial: for the young weak Nymphs falling on thoſe ſhady places (except the weather bee warm and dry) are in danger to bee chilled, before they can riſe again.

Let it not bee a bare ground, for in Winter it will bee wet, and chill the Bees when they light on it, and in the Summer duſty, and falling on it if they riſe not preſently, but go a little, their feet being dew-clawed, and ſcabrous, will quickly fur, and they will bee ſo clogged, that they will not bee able to riſe at all.

Let them not ſtand above a foot, or a foot and a half from the ground at the moſt, for if they ſtand higher (as moſt ſet them) they are more ſubject to the violence of the winds, for though they do well enough abroad in windy weather, yet when they return home, eſpecially in the Spring, they will bee beaten down beſides the hive (and the more if they ſtand upon ſtools than on benches) and if there bee a preſent ſhoure (the weather then is variable) or the Sun ſuddenly over-caſt, they will quickly chill, and periſh.

That they infect one another with their ſmell if they ſtand too near together (as Mr. *Levit* ſurmiſeth) I never found, nor do I beleeve. And if great noiſes offend them, the higher they ſtand, the more are they ſubject to them.

I have obſerved that Bees flye more frequently to their work Eaſt-ward than any other way, though there bee as good gathering to the Weſt.

Smoak

Smoak is very offensive to Bees, let them not stand therefore near a Brick-kilne, Lime-kilne, Brew-house, or where any long continuing smoak may beat down upon them.

Let your Bee-garden, or the ground adjoynin to it, bee planted with all sorts of Plumbs, Cherries, Apples, Pears, Goos-berries, Rasps, Ribes, and beds between planted with all sorts of flowers that they delight in, I will give you a Catalogue of them in their proper place.

The humble Plains, or lowly Vallies are commended as the best place for a Bee-garden. Columel.

CHAP. XIII.

Of the Bees work.

WHen the Earth begins to put on her new apparel, and the Sun runs a most even course between the night, and the day, then most commonly, sometimes before in warmer seasons, the industrious Bee hating idleness more than death, diligently visits every tree and flower that may afford her materials for her livelihood. Hear how an ancient Poet expresseth it.

When forgot had the Earth his poor estate
Of Winter, that him naked made, and mate,
And with his sword of Cloud so sore grieved,
Now hath the attempre Sun all that relieved,
That naked was, and clad it new again,
The busie Bees of the season fain, &c.

Chaucer Prologue to the legend of good women.

Pliny was deceived in the time of the Bees working, for hee saith, they lye quiet in the hive untill after the rising of the *Virgiliæ*, which are the *Pleiades*, or seven stars in the neck of *Taurus*, about the third of *May*.

This incessant labour while the time permitteth, with the three singular effects thereof, working of wax, making of honey, and the feeding of their young. The Poet in few words hath elegantly expressed.

But when bright Sol hath baniſh'd Winter chaſ'd
Virg. Geor. l. 4. *Under the Earth, and Summer light hath grac'd*
The skie again, over the fields and woods
They wander ſtreight, lightly the brinks of floods;
They ſip and taſte the purple flowers from thence
(What ſweetneſs ere it bee that ſtir their ſenſe)
Care for their brood, and progeny they take,
Thence work their wax, and hony clammy make.

Ariſt. de hiſt. Animal. l. 5. c. 19. Bees gather of all things which have flowers (as it were) in a hoſe or ſocket, and of all other things which are ſweet; but either aſſertion is too general, as wee will ſhew when wee particulariſe what they gather of. *Scaliger* commenting upon him, goes further, and ſaith, They gather alſo of bitter, and ſharp things, as Raddiſh, and Muſtard-ſeed, but hee miſtook himſelf, for the flowers (which they onely gather of) are neither bitter nor ſharp.

Æliun l. 5. c. 12. The fabrick of their combes is an inimitable excellency, without all rules or compaſſes do they make their hexangle cells. As ſoon as they are furniſhed with a new houſe, they begin their work.

Ariſt. de hiſt. Animal. l. 9. c. 27. They gather not, whatſoever ſome groundleſly imagine of the Sallow, Elm, or other trees any gummy ſubſtance other than wax. Indeed the Hornets, and Waſps ſuck the ſap that leaks from ſome Oaks, Elms, and other trees, wherewith they temper the dry roſſie droſs, that they gnaw off from old decayed poſts and pales, of which mixed together they frame their combs.

Much adoe the Ancients make about the foundation of their work, which they conceit to bee framed of ſome tough and glutinous matter other than wax, and they fancie a triple foundation, for the combes, all of ſuch tough, but pliant, and limber ſtuff, differing ſomewhat one from another, and all from pure waxe: The firſt foundation they call *Commoſis*: A ſecond, which they over-lay the former with *Piſſocera*; and the third, wherewith they cover the two former *Propolis*.

But whatſoever they fancie, the foundation of the Combs is not any other than ordinary waxe: Take an old Hive wherein ſome remnants of the Combs have been left ſticking to the ſides,

ſides, or if there bee none, fixe towards the crown of the hive in ſeveral places, little fragments of waxe, and hold the hive a little over a blaze of ſtraw that the waxe may melt and diffuſe about the ſides of the hive, and ſuch a hive will they more contentedly work in than any other, preſently to that foundation of wax, faſtening wax new gathered from the flowers (for in ſome Iſlands plentiful of Bees, there are no trees for ſome miles, as Fowlneſs, &c.)

They faſten the firſt wax near to the center of the hive, if they bee many, but if there bee few Bees then near the ſide, they make their combs perpendicular, beginning at the top, and ſo working down to the bottome; the heat of the Bee (that I ſay not of their breath) maketh the wax warm and pliable, that at the firſt gathering they can work, and turn it to their purpoſe.

They will not onely work artificially the wax they gather into thin hexangles, but blow and ſoften, and work a ſolid peece of wax into a comb, as I have often experimented, putting a peece of wax under a hive almoſt combed to the board.

The order of their work is thus: They faſten their firſt wax to the hive, and adding more ſtill, make firſt the middle between the cells, and having wrought a little of the thin bottome, than on either ſide begin to raiſe the hexangle cells, and ſo ſtill deſcending to the bottome, as ſome are fully finiſhed, others are but half way, others new begun.

Their combes are placed otherwiſe than the Waſps, for the Waſps hang theirs one under another, and the Bees theirs one beſides another, beginning ſtill at the top, and at that diſtance that a Bee may reach from one to another. And uſually ſuppoſing them to ſtand with the entrance into the hive Southwards, they faſten and order them ſo, that in the breadth they are from Eaſt to Weſt, thereby better ſecuring themſelves from cold.

Their cells are made ſix-quare, according to the number of their feet of that length and wideneſs that each of them may eaſily contain a young Bee. More particularly they make their combes with ſuch artificial prudence, that they ſeem to out-goe *Archimedes*, for the wiſe Bee is not ignorant of Geometrical inventions, all her cells are hexangles, and have equal ſides, Baſil Hexem. Homil. 8.

not leaving by courses right forwards, that the lowest being joyned to the empty one, may not be pressed or prejudiced, but the angles of the lowest hexangles may be a basis and support for that that leanes upon them, that they may securely hold up, and bear the burdens put upon them, and the Hony may be contained severally, and apart in every cell.

And againe, the Bees contrive their Hony-cels both wisely, and artificially, for distending the Wax into a thin membrane, they frame together many and numerous cells, that by the frequency of the binding or knitting of the small cells one among another, there may be a stay or prop for the whole work; for every cavity or cell takes fast hold of his fellow, being separated by a small division from it, and all joyned to it.

And lastly, these pipes, or cells, are twice or thrice arched, and framed together like the rafters of houses.

Nicetas comment. in Greg. Nazian. orat. 43. to. 2.

Or they thus make their hexangle cels, which with a divers and opposite order answer one another, for some are placed at a right line, others are instead of foundations to them that lye upon them, and staies for the hony, both for the elegancy, and also the security of the work; so wisely and skilfully doth she fabricate her Store-house, for drawing out the Wax into a thin skin, or membrane, she makes thick and continued cavities, so as that thick composition of small things among themselves doe sustaine and underprop the whole work, for every cell doth joyn or hang to his fellow, being divided by a small partition, and also (as before) conjoyned together.

In a word, the cells are so framed that they have two or three floores or rafters, for she is affraid to make but one through the whole cavity, lest the hony pressed down with the weight, should sink to the external part.

Now all the cells in every Combe are hexangle, and equilateral, not leaning straight forth one to another, lest the loweſt parts joyned to the empty ones should be too much burthened, but the angles of the lower hexangles are instead of a basis, or prop to the superiour. After this fashion the Bee frames her work, varying right lines with angles.

Elias Cretens. Antist. com. in Greg. Nazian. orat. 2. de theol.

And thus saith another, where had the Bees such studious industry and workmanship, that they should after such diverse manners knit together their Combes by hexangle Pipes turned one

one against another, which connexions made wisely, and with much cunning, doe hold together by hexangle pipes, which pipes are the long and concave Store-houses for the Hony; now these are opposite to, and turned one against another, for some are placed straight, others on the contrary are obliquely stretched forth on the bottomes of them which are drawn forth right, which doe afford their sides for the pipes that hang over, instead of a foundation, and as it were a shore, whereon the hony may rest.

Now what *Euclid* busied in representing lines which are no where, and anxiously labouring in demonstrations can imitate them? The frame and manner is most curious, with holes on both sides of the Combes, many hundreds, and yet they are none of them just one against another, but placed triangular one among three, and that most neatly and artificially, which argueth their feeling to be good, for they doe all in the dark.

Each hexagonical bottome of one side, answereth to three third parts of the hexagonical basis of three contiguous cells on the other side, meeting all in one angle right in the center of the opposite bottome, as in this forme;  which is so artificial, as well for strength and beauty, that no Schadon though the thin bottome of his cell should faile, can break thorow into a cell of the other side. He that seeth this, seeth he not a wonder? Mr. But. Fem. mon, c. 6.

How much Wax they bring at once doth appear by the new Swarme, whose first weeks work is spent chiefly in building Combs, wherein they are so earnest, that it falleth out with them, as it is in the Proverb, *The more haste the worse speed*; for part of many of their burdens doe fall from them before they can fasten them to the combes.

You may see great store upon the stoole by the skirts of the Hive, like unto the white scales which fall from young Birds feathers (but whiter and brighter) and therefore some have imagined that they also are scales, which the young Bees doe likewise shed from their wings; but put you some of these parcels together, and you shall quickly be resolved of that doubt.

The Swarme when it begins to work falls low towards the bottome of the Hive (in appearance filling it) that there may be a vacuity and hollowness above, that those that work (for at

first

first all cannot) may neither be crowded, nor disturbed, but as the Combes descend, so doe the Bees ascend, and after a week or ten dayes will be all above.

Now to say something of their gathering of Hony, which they fetch in little or much nine moneths in the year; this is of two sorts, the one pure and liquid, called therefore by some *Nectar*, as the other which is gross and more solid *Ambrosia*, and both of them are the Bees food, but in several seasons.

The gross hony *Sandaracha*, or Bee-bread, is gathered by their tongues, with the assistance of their fangs, from whence it is conveyed by their fore-leggs to the thighs of their hind-leggs, and that so nimbly, that unless you have a quick eye you cannot perceive it. In the Spring, when the air is colder, and the Bees duller at their work, it is more visible: namely when they gather off the Aglets, or Catkins, of the Hazel, or the Willow a little after.

Many out of curiosity have supposed, that they might be able to observe the Bees work if they had a transparent Horn-hive, as a certaine Consul in *Rome* had, or a clear Glass-hive; but the vanity of this opinion will quickly appear to any intelligent and rational man; for imagine the Hives were more transparent than Chrystal, unless the Bees also, and all their work too were transparent as well as the Hives, this cannot be; put an opacous body into the hollow of it, your sight is dulled and darkned, but more when they once begin to frame their Combes, the foundation of their work, which they frequently compass round about; and howsoever such Hives would not be profitable, for they are subject to violent heats and colds, and therefore earthen Hives were justly condemned by the ancients.

Guliel. de Conchis.

But if any be desirous to satisfie himself, as much as is possible, I will direct him in a more certain way, often experimented by me, yet I say nor, that I will altogether undeceive his expectation.

Let the board or plank whereon the Bee-hive stands have a small hole, or cleft thorow the middle of it (bigge enough for a Bee to goe through) or let the Hive stand a little over the board or stoole, and when the Hive is full you shall ordinarily have them work Combes to the bottome of the board under the Hive; I have had under one hive six or seven Combes about a

foot

foot long a peice, wherein they bred their young, laid up their hony and Bee-bread as in the hive; and although they were in the open air, yet was I thereby little the wiser, only sometimes in a colder season I have observed them blowing, and working of the lower part of their Combe, but was not any thing at all enabled to understand the generation of their young, or other curiosities which were performed in the inmost combs, and within themselves (except the Bees and their work too, had been transparent) they still some of them encompassing their work; and therefore except you can with your eye penetrate a solid body, you will conceive thereby little of their work (only sometimes on the edges of their Combs) and much less in a Glass-hive.

They unload into the empty cells the Bee-bread which they have gathered for food for themselves, when they cannot goe forth to work, and also to feed their young, but if it continue any long time uneaten, it wil grow dry, insipid, and sower, and thereby as tastless, so useless, and oft cause the Bees to forsake their Hives (as some suppose) but this is never the chief cause of their departure, but rather paucity and fewness of Bees, having over-swarmed, or else the loss of their commander. For, hive a swarm into old combs where is much stopping, yet shal you finde that they will thrive wel, for they wil draw it out of the cels with their fangs, and carry it forth. And let the combs be never so old, except they have taken wet, and so be rotten and crispie, they wil like well of them, only if they be very old, they will doe as Masons doe with old stone buildings, take down the out-part and work it again with new materials, whereby it shall be as good as new, and they continue as long, and as well in them, as if they had been put into new combs.

Into old combs (after nine or ten years standing the Bees by casualty dying) I have hived little or late swarms, which have continued in some of them ten years more.

Sometimes my owne, sometimes my Neighbours Bees have trimmed up such Hives as they have found standing (the Bees being dead) and have gone of themselves into them, and thrived better than others hived into new hives, or new combs; so that blackness (as it is commonly thought) is not an infallible signe of a faulty hive, for the combs have successively sundry colours.

The first colour is white, which in a good Hive before the end of Summer will turn to a light yellow, and by the beginning of the next Spring, this light is changed into a sad colour, and so by degrees it becomes brown, and then black, but not in all parts of the Hive alike, for the combs will bee black before, and brown in the middle when they are yellow, if not white in the backward combs. And this alteration of colour, is caused by the heat of the Bees, who lying for the most part before, do soonest discolour hem; but the blackest combs (tried or melted) will turn again to yellow.

It is not amiss (especially if the Hives bee poor) to cleanse away in the Spring the dross and filth that the Bees have contracted all Winter when they could not go abroad, but for fuming of them, as some require, I never saw any cause, nor found any profit in many years that I have been conversant among them.

To seek (as *Varro* requires) if there bee divers rulers, because divisions would make them lazie, is a ridiculous, if not impossible task: They kill after the last swarm all of the blood Royal, and in the Spring early breed new, that they may bee ready to go with the first swarm.

The Vulgar when they see the Bees go home laden with Bee-bread, suppose they carry wax, and so they call it, but if you taste it, you will easily resolve your self.

Besides, if you would coagulate it together, with the heat of your fingers (as you may wax) you cannot, but shall finde it crumble, and not stick together like wax. Put it into the fire, it will not melt like wax; besides, it is of divers colours according to the quality of the flowers, or plants whereof it is gathered, so that by the colour with a little observation, you may say of most of the Bees, when they return with it, where they have been gathering.

Taste it when it is new gathered, it is sweet, and not unpleasant, but not so sweet as honey.

And that it is not wax, take notice of an old stock into which they carry plentifully of it, and yet at the end of the year there is no more wax (of so much) then there was in the beginning. Whereas a swarm will sometimes work down half their hive in a week, and yet you shall see them carry little of it if any at all.

And

And the reason that the old stocks carry in so much, is, because they have many young ones to feed, whereas a swarm for the first ten dayes, ordinarily have not hatched much spat, or young brood, and they feed for the most part abroad, and therefore need little of it in the Hive.

The liquid honey the Bees suck or gather with their tongue, whence they let it down into their bottles, which are within them like bladders, each of them will hold a drop at once; you may see their bellies strut withall. Many think because they see nothing on their thighs, that they come home empty, but they are better, and more heavy laden than the other.

This sedulous diligence and indefatigable industry of the Bees is most evident and eminent in the Spring, after they have been long confined to their hives with the Winters frost and cold, but being set at liberty by the Suns warmer beams, they speedily scoure over hills and dales gathering of every blossome, and flower as greedily as the griping Usurer graspeth gold, which diligence of theirs, is notably expressed by a Modern Poet.

Quales vere novo ficuleæ sub collibus Hyblæ
Vallibus, aut riguis late fragrantis Hymeth
Exercentur apes, stabulis ubi pinguibus agmen
Prodit mane novum, & cœlo bacchatur aperto.
Hæ veris populantur opes, Tymbræque laborant:
Illa Apii lachrymam, & graveolentis Centaureæ
Narcissique legunt florem, Casiasque rubentes:
Cætera dum legio tectis ascripta, tenaces
Suspendunt ceras, & mella liquentia fundunt.

Ælius Julius Crota. Bidyl. 3.

Thus in the Spring the diligent Bee spreads forth her wings, yet stiffe as it were with the Winters cold, and with haste leaving the hive, flyes to the flowery Meads and pleasant Gardens.

Greg. Nazian. orat. 43. t. 2.

But for your further delight, consider the Bees labour, in the words of one of our best English Poets, yet somewhat altered, because not intended by him for this purpose.

The Woods, the Rivers, and the Meadows green,
With her air-cutting wings, she measureth wide,

Spensers Minopotmos.

Ne doth ſhee leave the mountains bare unſeen,
Nor the rank graſsie Fens delights untri'd;
But none of theſe how ever ſweet they been,
Mote pleaſe her fancy, nor cauſe her t'abide
Her choiceful ſenſe with every change doth flit,
No common things may pleaſe a wavering wit.

To the gay Gardens her unſtaid deſire
Sometimes her carrieth, to refreſh her ſprights,
There laviſh nature in her beſt attire
Pours forth ſweet odors, and alluring ſights,
And art with her contending, doth aſpire
T'excel the natural, with made delights.
And all that fair or pleaſant may bee found,
In riotous exceſs doth there abound.

There ſhee arriving, round about doth flye
From bed to bed, from one to other border,
And takes ſurvey with curious buſie eye,
Of every flowre and herb there ſet in order;
Now this, now that, ſhe taſteth tenderly,
Yet none of them ſhee rudely doth diſorder
Ne with her feet their ſilken leaves deface,
But paſtures on the pleaſures of each place.

And evermore with moſt variety,
And change of ſweetneſs (for all change is ſweet)
She caſts her taſting ſenſe to ſatisfie
Now ſucking of the blooms of herbs moſt meet;
Or of the dew, which yet on them doth lye
Now in the ſame bathing her tender feet.
And then ſhee pearcheth on ſome brensh thereby,
To weather her, and her moiſt wings to dry.

And then again ſhee turneth to her play,
To ſpoyl the pleaſures of that Paradiſe;
The wholeſome Sage and Lavender ſtill gray,
Sweet Carrowayes, and Cummin good for eyes,
The Roſes reigning in the pride of May,
Sharp Iſop, good for green wounds, remedies;

Fair

Fair Marigolds, and Bees alluring Thyme,
Sweet Marjoram, and Dayſies decking prime.

Cool Violets, and Burrage growing ſtill,
Embathed balm, and chearful Galingale
Goodly Tulips, and breathful Camomile,
Dull Poppy, and drink quickning ſetwale,
Vein-healing Vervain, and Head-purging Dill,
Sound Savory, and Baſil hearty hale.
Fat Cole-Worts, and comforting Strawberry,
Cold Lettice, and refreſhing Roſemary.

And what ſo elſe of vertue good or ill,
Grew in the Garden, fetcht from far away.
Of every one ſhee takes and taſtes at will,
And on their pleaſures greedily doth prey. &c.

CHAP. XIV.

Of the ſwarming, and hiving of Bees.

BEes breed in *May*, when there is plenty of honey dews: Waſps in Summer, when the fruits begin to ripen. It is true Bees breed in *May*, but their chief breeding is in *March*, and *April*. And although the Waſps appear not in great numbers untill the latter end of Summer, yet they begin to breed in the Spring. Dr Harvey de parta.

The old ſtocks having bred in the Spring, and with a new ſupply repleniſhed their hives, they preſently prepare to ſend forth a Colony or two (if the weather prove ſeaſonable) out of every good ſtall.

In extraordinary dry and windy times, many, though they bee full, yet they will not ſwarm at all. For having waited long for an alteration of the weather in vain, and the year wearing away, and they by lying forth under, or about the ſides of the hive, cooling themſelves, and being well provided for, are loath to leave their labours to go anew to labour.

Sometimes it falls out, becauſe they have no Commander

ready. I once had a very good hive full, and multitudinous with Bees, and yet never ſwarmed in many years, I was reſolved to let them alone, to try whether they would ever ſwarm; in the eighth year they ſwarmed twice, and alſo other years after, what might bee the cauſe of their long delay, I cannot certainly aſſign.

The ſwarm conſiſts not of younger Bees, then the ſtock, for there go forth both old and young, and therefore *Ariſtotle* was deceived, who ſaid that the ſwarm conſiſted of young Bees, and was not contradicted by *Scaliger* commenting upon him.

Arist. de hist. Animal. l. 9. c. 64.

The ſwarm parts not into ſeveral companies, but when there are more Queens than one. Some Drones go along in every ſwarm, but not many, ſeldome a dozen: And therefore whereas ſome lay it down as an infallible rule, That thoſe ſwarms that have not many Drones will not thrive, is not alwayes true.

Many times the weather proving ſtormy, and cold, the Drones will all bee ſtarved, when as the Bees will ſupply themſelves by going ſometimes (though ſeldome) abroad. Nay the Bees often in ſuch ſeaſons jealous of their own ſafety (and knowing them to bee great devourers) will kill them; and yet the weather proving ſeaſonable, afterwards have thriven and proſpered well that year, but perhaps they had a conceptive power by a maſculine vertue from the Drones before they ſwarmed.

It is impoſſible to determine the preciſe time of the year when Bees will ſwarm, but by the forwardneſs of the Spring, and warmneſs of the weather you may probably gueſs.

A warm, calm, and a ſhowring Spring cauſeth many and early ſwarms; but it is to be ſuppoſed if ſtormy, cold, and cloſe weather follow, not a great while together, immediately after. I once had many Hives (the beginning of the Spring being milde and warm) very forward, ſo that by the end of *March* they began to lye forth.

And although the weather within a week of *April*, did ſomewhat alter, yet (being full of brood within which came daily to perfection, they lay forth in abundance by Mid-April, but the Spring continuing tempeſtuous and cold untill a week in *May*, ten of the very beſt wholly periſhed, having many mouths

mouthes and no meat, and not being able (becauſe of the cold) to goe forth to gather any, in *January* before; I am confident the worſt of them had not leſs than three quarts of hony.

Now thoſe that were poor and weak began not to breed ſo early, and though they were not ſo well ſupplied, yet had they few mouthes as they had a little meat, and endured the extremity, and ſwarmed that year, but ſomewhat later than ordinary; the firſt ſort lying forth without the Hive I could not ſecurely feed them, which otherwiſe I would have done, when I perceived them to periſh.

Sometimes alſo in regard of the uncertainty of the weather, early ſwarms are not the beſt; in the year one thouſand ſix hundred fifty two, I had twenty ſwarms before mid *May*, and many more after, and of all, but one ſurvived until the next year, for the year was ſo dry that by Midſummer there was ſcarſe any flowers, and they yeelded little hony, except in the Woodlands, where the Bees among the moyſt and ſhady places found better proviſion.

Many times *May* ſwarms prove not ſo well as thoſe that are caſt in the beginning of *June*, the Wind oft times continuing high and cold, and the ſeaſon cloſe, ſo that without a little refreſhing many ſwarms are like to periſh.

If a ſwarme by bad weather be checked, and hindred in their work the firſt week, they will ſeldome work courageouſly all the ſummer following.

Dry weather makes plenty of hony, and moyſt of ſwarms, ſo that when a dry ſummer follows a moyſt ſpring, the Bee-folds are rich, but if the ſummer be alſo moyſt, the increaſe of Bees will be great, but becauſe of the ſcarſity of hony, this increaſe will prove a decreaſe; the more ſwarms you have at the end of ſummer, the fewer ſtalls ſhall you have at the beginning of the next, for except ſome very early ſwarms, and ſome good ſtocks which caſt betimes, or not at all they will all dye for hunger; and the reaſon is, that the weather keeping them much in, they can doe nothing but breed, and when they goe abroad, bring in nothing but Bee-bread and water, wherewith they feed their young, but can finde nothing to lay up in ſtore; ſo that moyſt weather gives them two cauſes of ſwarming, plenty of Bees, and penury

Ariſt. de Hiſt. animal. lib. 4. c. 22. Mr. Butler, Fem. Mon.

penury of Hony; the one makes them able, the other willing, and then neither Winds, nor Clouds, nor Rain can stay them, whereas in times of plenty it is otherwise.

Arist de Hist. Animal lib. 9. c. 10

Before they swarme some daies, they will by a peculiar and distinct voyce, make it known throughout all the Hive, as in the dislodging of an Army by the sound of Trumpets, proclaime, pack up, and be gone; so that as a presage of their swarming, there is a peculiar sound heard two or three days before.

Virgil.

——— *And then a voyce*
Is heard, resembling Trumpets winding noyse.

Mr. Muff. Theatrum Insect.

Mr. *Mouffet* mistakes this place strangely, and applying it to the Bees, saith, When the Bees for the Queens tyranny will forsake the Hive (which falls out at the Greek Calends) there is a peculiar and solitary voice, as of a Trumpet, heard two or three days before: when therefore they are ready for their flight, away they goe, and if the Tyrant whom they forsake follow them, they put her to death.

But this voyce is not at all, or but some few hours before they goe forth with their first Colony, it is true indeed always of the after swarms, but by the way, if they hear not at all, (which *Aristotle* elsewhere denies) to what purpose were this call, or proclamation to make ready to be gone?

Varro de re rustica, lib. 3.

The signes of the first swarms are somewhat uncertain, but lying out, about, or under the Hive, in the mornings and evenings only, is a very probable signe of swarming, whereas to lye out constantly, is a signe of not swarming.

When they will presently swarme you may sometimes know, by their gathering together without at the door of the Hive, and not only upon the Hive, but on the stoole also, where when you see them begin to hang one upon another in swarming time, and not before, and to grow into a cluster that covers the stoole in any place, then be sure they will presently rise, if the weather hold; but commonly some few doe first fly forth to and fro the Hive door, with a greater noyse than ordinary, and so allure out more company unto them, and when by this means they have got out a pretty many, the noyse made by them is more smart and vehement, when they begin to dance before the Hive, and making many circling motions turning from, and yet againe returning to the Hive, with delightful melody singing a loath to depart,

depart, invite all their Sisters to hasten apace, and wait upon their Queen now on her coronation day.

Their murmuring small Trumpets sounden wide,
Weiles in the air their clustring army flies,
That as a cloud doth seeme to dim the skies.

Spenser Faery, Q. lib. 2. cans. 9.

When Bees lye continually forth of the Hive, they usually swarme late, sometimes not at all that year, the reason thereof is, because the Hives being ful of Bees, and therefore very hot, the Bees to refresh and coole themselves lye abroad under the Hive, or upon the sides thereof, whereby the Hive never seemes over full; and they having used a while to lye forth, finde no inconvenience from their multitudes, and are loath to forsake that plenty which they have painfully gathered.

If they begin a Combe under the board, it is a sure signe of not swarming; sweep them down that hang under, and imbitter the place, and gently drive them into the Hive with a brush of wet stinking weeds, or smoke them in, as you shall be more fully informed afterwards. But doe what you can, some Hives wil not swarme at all, or not a great while, perhaps they want a Leader.

Always choose a Hive answerable to the swarme, a forward swarme if great, may be put into a Hive that containes somewhat more than three pecks, but if it be a prime swarme, in the beginning of *June*, into a Hive containing three pecks; if at Midsummer, into a Hive somewhat less, but I like no Hive that holds not somewhat above half a bushel.

By this time the swarme is setled, goe presently therefore to hive it (having Hives of all sorts alwayes prepared) for fear of rising again, or of others coming to it.

If it be in the heat of the day, and the Sun shine upon it, it will not stay long, if it be provided of a place (hive or tree) as some are before hand; presently after they are setled, and all their company gathered together, they wil uncluster, rise againe, and be gone, and fly forth right thither (not as at other times uncertainly) and wil not be staid by any course you can take. If they be not provided before-hand, as soon as they are gathered together, they designe, or empower some of their company to

espy out one, and if they return with the news of it before swarming time bee past, for that day (and they yet unhived) they will presently uncluster, and away, otherwise they will hang untill the next day. They therefore deal indiscreetly, that let their swarms hang untill night, losing thereby many, and hindring them in their work; for as soon as they are hived, if it bee not late in the afternoon, they will presently ply their work, and sometimes make a comb a handfull long before night, and fill much of it with honey, as I have often found, when I have united them to another.

And besides by long hanging, they will bee wonted to the place, that for some dayes after, they will hanker thereabouts, and neglect their labours.

And where there are many Hives, there is great likelihood of others rising, and then if they bee within hearing, they will flye all together; bestir you therefore to hive them presently; and if you espy any other to arise before you have done, stop them up with a cloath (and when you have dispatched, let them out) but if you have finished before they come forth, or come towards you, cover the first with a sheet untill the last bee settled elsewhere. But if they flye about the covered Hive, seeking to enter there, set down a prepared empty Hive by it, and they will often go in of themselves.

But if two prime swarms rise together, then there is no prevention, but for the most part they will settle together: Hive half of them into one Hive as near as you can guess, and the remainder into another. And if the Queen Bees be divided, they will continue severally, otherwise, will go out of that Hive where is no Queen, into the other. When they are all entred into one, knock them down into a fan, or upon a very broad board, and set two Hives over them, having first laid sticks along in the fan to bear up the Hives a little from the bottome, that the Bees may on every side easily enter in, and with a wing or brush of weeds, sweep some to one, and some to another, as equally as you can. But if notwithstanding all your endeavours, they will go to one Hive, then fetch a weak castling, and knocking down near half upon the fan, carry the other away the distance of a rod, or more, and set the castling over those in the fan, and so shall you have two good Hives howsoever.

If

If your ſwarm light upon a bough, ſhake them in gently, and ſet them upon a board or fan, underneath the place, having laid two ſticks firſt (near an inch about) about half a foot aſunder, to rear up the skirts of the Hive, that no Bees may bee cruſhed by the Hive, and the Bees may more readily enter. And if any riſe as (uſually ſome will) ſhake them down, and lay a handfull of May-weed, Wormwood, or other wet herbs in the place where they ſetled, and they will quickly remove, and goe to their fellows; but if they light very high, then carry up a cloath with you, and cover them that you have in the Hive, and bring it down with the mouth upwards, and ſet them below (on a fan as before) and fetch the remainder in another empty Hive covered, and when you are down, knock them out by the ſide of the former, ſometime you muſt do it, a third, nay a fourth time before you have all.

If they light upon the body of a tree (they will bee troubleſome to hive) you cannot take half of them in at once, but ſweep with a wing or bruſh of weeds, as many as you can, and ſet them underneath the place, and fetch the remainder, as before.

Sometimes it will not bee amiſs to ſaw down gently the bough (when you cannot otherwiſe well come at them) where they hang, faſtening firſt a little line to it, and ſo ſoftly let it down, or elſe bring it down in your hand. I have brought down many, and hived them with eaſe below. At other times when they have been very high in the middle or out-ſide of a tree, I have carried up a fan, and faſtened it by the ears underneath the ſwarm, and ſo hived them as eaſily as if they had been near the ground, ſetting them in the fan, laying ſticks firſt in it, as I preſcribed before. And in the evening without any trouble, fetched them down, and ſet them in their place.

The manner of hiving is very various and manifold, by reaſon of the many and different circumſtances of the lighting, or pitching, that it can hardly be taught by rules, but is rather to be learned by uſe, and experience, guided with reaſon and diſcretion.

If they ſettle on a dead hedge, or on the ground, ſet the Hive over them, under-propping it if there bee cauſe, and with a handfull of wet weeds ſtir them ſoftly underneath, and they will

go up, and to allure them the sooner, anoint the edges of the Hive with a little honey, and sprinkle a little within it.

It will not be amiss to shred, and order here and there some boughs of the trees in, or near your Bee-garden, that they may hang out, as it were from the rest more opportunely to entertain the Bees when they swarm. Yet in places where are neither trees, nor dead hedges, they will settle upon pales, nettles, mallows, they will refuse nothing they readily meet with; sometimes on the very grass: Thus in the Island of *Fowlness*.

Mr. Butler Fem. Mon. c. 5.

To cause stocks that lye out more speedily to swarm, divers rules are prescribed. To keep them cool by watering and shadowing of them, and inlarging of the door, to give them aire (alwayes provided that there be no back-door in the Hive) I have with a contrary course occasioned their swarming, first rubbing the bottome of the stool against the door well with wormwood, or the juyce of Elder, and all the sides about the door, and laying wormwood, or May-weed also, close to the mouth, and also before, above the door; which being done, I have in the heat of the day taken off their cover, so that not being well able to continue in the Hive, nor yet to rest under it, nor on the sides of the Hive, they have presently swarmed.

A second way prescribed by Mr. *Butler* is, when they have lain out (although they have had fit weather two or three dayes) then the next calm and warm day a little before noon (when the Sun shineth, and you see no clouds coming to hide it) put in as many as you can with your brush (it is better to smoak them in) and sweep down the rest, not suffering any to cluster again: These rising in the calm heat of the Sun, will make such a noise, as if they were swarming, which their fellows hearing, will perhaps come out unto them, and begin to swarm. It is but a perhaps, for I have seldome seen this course successful.

When all hope of their swarming is past, in some evening while it is yet light (saith Mr. *Butler*) holding a Hive under those that lye out, cut them off with a tight thred held streight between two hands, and carry them to an over-swarmer that you would mend, knock them down on a table close before his Hive, into which, because they come without a Prince, they are quietly

quietly admitted, and quickly united under one Commander: Stay there, I have often tried this course, but without success always; for though they bee without any great contest admitted and continue there that night, yet the day following, they will return to their old Hive.

See here the difference between a voluntary emission, and a compulsive; when they go forth with a Leader, you may put them any where, for they have by a voluntary departure, excluded themselves from their former society, and to return thither again, except it bee in a short space, is capital: They are reputed as enemies, forsaking their own Commander, and going away with another Leader; but if their Princess in a short space return with them, there is no question about their admission; but if by a wile they are taken from their own company without a Leader, they will return back again do what you can, except you carry them so far that they know not the way.

Mr. *Butler* for such Hives as have not swarmed before Midsummer, directs this course, to double the stall, by turning the skirt of the Hive upward, putting the crown into the rim of an old Pale (or the like) well staked about, that it may stand fast, and setting an empty prepared Hive fast upon it, then dawb them (in the middle where they are joyned) round, onely leaving a passage even with that of the old stock, and they will ascend into this, and breed, and work as well as in the old. And in the end of *August*, you may drive them all into the new, and take the old for your labour.

This course seems plausible upon the first proposal, but upon frequent trial, I have found it to little purpose: For the Bees having many young ones in the old Hive, and much meat, will not ascend, but as they are necessitated for room, and then work their combs to the old, upwards, and not downwards from the top of the Hive, newly set over them; so that by parting of the combs which will not bee without trouble, you may take some little profit of the combs new wrought, but must continue the old Hive to stand still, except you mean to take all, I never found any to have wrought above half way upwards, so that having no foundation, but the old combs, it is impossible to set down the new Hive.

Bees will ſwarm any time of the day, between eight in the morning, and four in the afternoon, but the chief time of ſwarming, is between eleven and one. Many ſtocks when they are diſpoſed to ſwarm, will riſe in a cloudy ſeaſon often before the Sun ſhine upon them, I have had ſome by eight of the clock; but chiefly in a hot gleam, after that a ſhowr, or a dark cloud hath ſent them home, but in hot and dry weather it is not ſo. The ſwarming months are *April*, *May*, *June*, and *July*; rarely, though ſometimes in *Auguſt*.

To judge by the time of their ſwarming, which will thrive, is very uncertain, becauſe of the variable weather that often follows after, for being checked a little, and diſcouraged at the firſt, for a week together, they will ſcarce work kindly all the year after, ſo that many (though leſs, and coming a month after) not hindred at all by ill weather, will bee better than thoſe at the end of the year. And another cauſe why forward ſwarmes thrive not after foul weather, is, becauſe they are very ventrous abroad, and by the ſtormy winds, and unſeaſonable weather many are diminiſhed, and thereby their increaſe exceedingly retarded.

Signes of after ſwarms are more manifeſt and certain, for about ten dayes after the firſt ſwarm is caſt, ſometimes a little ſooner, ſometimes a day or two later, the next Princeſs will begin to tune in her treble voyce a mournful and begging note, as if ſhee did pray her Queen mother to give her leave to bee gone, unto which voyce if the Queen vouchſafe to reply, tuning her baſe to the young Princeſs treble, as commonly ſhee doth (though ſometimes not intreated in a day or two) then ſhee conſents, and the third day after expect a ſwarm. The firſt day after the grant, how fair ſoever the weather be, they will not go, and not ordinarily on the next day, except it bee very fair; but on the third day, though it bee ſomewhat cloſe, and cloudy weather, yet ſometimes the weather proving very cold and windy, I have known them ſtay five or ſix dayes after liberty granted.

The evening before they ſwarm, the young Princeſs goes calling from one part of the Hive to another, ſometimes ſhee is before, ſometimes behinde, ſometimes above, but ſtill calls, and reſting a while between, ſhee ſtill renewes her calling. In the morning

morning before, shee often descends to the bottome of the Hive, with shriller and thicker, longer, and more continued notes than at first, that none may plead ignorance, but all know, and acknowledge, there is a new Princess, and bee ready to attend her when shee takes possession of her Royalty, dealing herein (but that shee is her own officer, and it is no disparagement, for the Queen mother is her continual assistant) as Princes on earth that come newly to succeed in their Dominions, they make it known by sound of Trumpets, and Proclamations, in the most eminent parts of the Kingdome.

But take notice by the way, that sometimes the Commonalty (knowing best their numbers within, and the state of the weather abroad) not thinking it good to make a division, will after leave obtained, kill the young Princess, and all the infants of the blood Royal, but this is not ordinary.

If the Queen mother after a long intreaty be silent, then there is no way but one, shee must dye, and all her Allies. As the Queens voice is a grant, so her silence is a flat denial: The Proverb here hath no place, *Qui tacet, consentire videtur*, for without this concent, there is no consent. Mr. Butler.

Sometimes a third, nay a fourth will arise after a second, if the prime swarm bee broken; but all (ordinarily) within a fortnight. I have known the last (but rarely, and in bad weather) seventeen dayes after the first.

When the swarm is up and busie in their dance, it hath been an old and common practice, for want of other musick, to play them a fit of Mirth, on a Bason, Warming-pan, or Kettle, to make them more speedily light, and keep them from flying away, but this (though ordinary) yet is needless in this respect, for they will settle of themselves, except they have chosen a place before-hand, which is very near. And then when their company is all out, they will flye directly thither, and your ringing and tinging, will prevail nothing to perswade their stay.

This benefit there is of ringing, that if you have neighbours near, you that keep Bees, you may give notice thereby to prevent wrangling, if some of theirs should rise at the same time.

Mr. *Levits* opinion is, That tinging is so far from preventing

venting their flying away, that it is often a cause to return them back into their Hive, if not to drive them quite away, for they are amazed as it were, and confounded with the unwonted and clamorous noise.

Mr. *Remnant* dislikes ringing before the swarm bee quite out of their Hive; but if they be on the wing ready to flye away, then prescribes to make the greatest sound you can to prevent it, as also by throwing up dust, Hogs-dung, or Cows-dung to disturb, and trouble them.

Aristotle doubting whether Bees hear, therefore questions whether they take pleasure in the sound because they hear, or for fear, because of the reverberation, and tremor of the aire?

Claudian de sext. Consul. Honorii.

That the ringing of Bees anciently practised, was for the former reason, the Poet implies, saying, The Bee-master ringing on his Bason by the shrill sound, labours to recall the Bees when they are flying away; and *Virgil* before him, and before him *Aristotle*, *Convocari eas in alveum aiunt*, they did cause them to return.

Mr. Mussel Theatrum Insector.

They flye faster or slower, according to the ringing, if hee strikes apace, they hasten away, but if hee beat leasurely, then they flye slowly.

But if they will not be stayed, but hastening on still, go beyond your bounds, the ancient law of Christendome permitteth you to pursue them whithersoever, but our common Law is more uncivil, and yeelds no such priviledge, for if your Bees bee out of your ground, your property is lost, if your neighbour bee not more courteous.

Many directions have been given, to arm them that hive the swarms to escape danger, but except they be about the body of a tree, or setled very high, you may without any cover, or defence securely hive them, otherwise get on a paire of Mittens, or wollen Gloves on your hands, and a thin Cypress over your head and face, and then without any fear, you may safely venture among them.

Second swarms after they are all forth of the Hive, will usually flye about (before they light) longer than prime swarms, the reason is, the Bees knowing that multitudes best thrive together, and they by the smalness of their murmuring sound, being privy

to

to their paucity, do by a continued flying about, allure as many as they can to come forth to augment their numbers.

Sometimes swarms will settle in two or more clusters, a little distance one from the other (seldome prime swarms.) Now usually the cause is, because there bee divers Commanders, and each gets a company. Hive the greatest cluster first, and set it down towards the other, then into an unspleated Hive, shake down the other, and when they bee all in, knock them down close by the first, and they will go together.

Second swarms except they bee early, and out of large stocks, seldome thrive alone: Therefore unite two or three together, and so they will bee as good as a first swarm; you may do it thus, Having hived that swarm that you intend to put to another, as soon as it begins to bee dark, take a fan, and laying a couple of sticks on it, set your first hived swarm on them towards one end of the fan, and then fetch the other, and between your hands clap the Hive hard on the one side, holding it close to the other, most of the Bees will fall down at the first clap, but reiterate your knocking, and they will all fall down, and if they enter not presently, stir and guide them to the Hive, with a brush of weeds, and such as go any other way, sweep them to their fellows, and they will all quickly, and quietly ascend. Within an houre or two, you may (for the most part) set up the Hive again in his place. I have not lost forty Bees in uniting twenty swarms, besides the Commanders, which of necessity must perish.

Swarms after they bee well setled, seldome return home again (if you let them not hang too long in the heat) and the chief cause of their returning at any time, is the miscarriage of the Queen Bee, who cannot well use her wings, being (perhaps) never forth of the Hive before, and assaying to flye, falls besides the stool, sometimes flyes further, but being quickly weary falls short of her company.

You may easily know if it bee thus, for as soon as you have hived the cluster, the first inquiry they make is for their Leader (whose coming while they hang, they did anxiously expect) but now being hived, and missing her, they presently discover it with a mournful murmuring, sometimes bewayling their condition, jointly crying out together, and then are all suddenly

whiſt and ſilent, and by and by again renewing their ſad lamentations, tumultuouſly likewiſe running before the Hive, and about the ſides thereof, as if they were not onely diſcontented, but diſtracted: Others are flying (but pittifully complaining, as they flye) about the Garden with a buſie Queſt ſearching for her; and if they do not in a ſhort ſpace meet with her, will all comfortleſs return to the ſtock again, whence they came forth.

But if they finde her, or ſhee be brought unto them, they preſently congratulate her return with continued ſhaking of their wings, and oral rejoycings, witneſſing their preſent contentedneſs, complacency, and ſatisfaction, making even their joyfull content in her, ſomething more joyfull than before, as if the felt pleaſure at her firſt return, were more delicious, and raviſhing, by reaſon of the ſudden change from that diſcontent, and diſtraction in their late loſs to an excellency, if not extaſie of delight and joy.

But if (not finding her) they return home, the next time they come forth, though in numbers a firſt ſwarm, yet not in the manner of their ſwarming; for the next Princeſs comes not forth at the will of the Commons (loſing their Commander, they loſe in this reſpect their liberty) but by petition muſt obtain leave of the Queen mother, as in ſecond ſwarms.

Now when you perceive the Bees diſcontented carriage, preſently ſeek about (beginning at the ſtock, whence they roſe, and going that way, the ſwarm took) and you ſhall undoubtedly finde her, for ſhee is not alone, but encompaſſed with a guard which will never ſtir from her, though they ſtarve in the place: Take her up therefore, removing the Bees that environed her (you may do it ſecurely with a little ſtick) and carry her to the ſwarm. And you cannot but with wonder behold the ſudden alteration, with what a rejoycing plaudite (their mourning being ceaſed) do they welcome, and entertaine her; and thoſe that were ſeeking for her abroad (although ſome rods diſtant) are inſtantly ſenſible of their felicity (by their fellows rejoycing) and haſtily return to expreſs their content, and bear a part in the general gladneſs.

If a ſwarm light near the place where another was hived a day or two before, when you have hived it, ſet it ten foot diſtant from the place where the other ſtood, for ſome Bees of the

the first hived swarm, will for two or three dayes together hanker about the place, and if they finde a hive standing there, will boldly enter, supposing it their own company, and so miscarry by the others, who take and deal with them as enemies coming to endamage them.

Swarms will the day after they are hived busily follow their labour, but the removing of them from the place where they were hived, doth not a little discourage them; if therefore the weather bee not fair, they will not stir the first day, and except it bee more than indifferent, they will not stir the second day, and so as the foul weather lasteth, droop, and grow faint, and sometimes totally miscarry.

To prevent this, the day after they are set up, when the Sun shines upon them, or howsoever about noon (except it rain) put a little honey under the hive near the mouth of it, and some at the mouth, and before the entrance (less than a spoonfull will serve) which they will quickly smell, and come down to feed on, and flye forth, and thereby bee acquainted with their new standing, and fall to work upon the first fair weather.

If the weather continue cold and cloudy a week together, without a little supply they will dye, therefore every day refesh them with a little honey. After they are acquainted with their standing, you may put it into the Hive upon a peece of an old comb in the evening. They can indure four or five dayes without meat, but if the foul weather continue longer, they will hanging by one anothers legs, fall down to the bottome of the Hive, and perish; but try them not too far, but quicken them daily with a little honey, and you shall keep them strong and lusty (such close and windy weather falls out often in *May*) you shall gain by this loss, for the weather altering, they will not onely subsist of themselves, but by their painful labours, recompence your cost and care.

If your stocks cast a second swarm after Midsummer, the best way is to return it home again. Hive it as you do other swarms, and about six of the clock knock them out on a table before their stock, and they will go in; and if they come forth again (as perhaps they will) do so the second time, and if there bee occasion, the third also, but look heedfully when you first

knock them out for the Queen Bee, and take her away, and then shall you bee sure to prevent further and future trouble. And thus shall you keep your stocks full and lusty, which otherwise were in danger of miscarrying, and the swarms (most years) would bee worth nothing.

Set the poorest swarms upon a plank, and when they have done working, dawb them round, allowing air, only through two or three quills and set them in a dry cold place of your house, or barn, and so being little sensible of the alteration of the air, they will sleep much, and eat little.

CHAP. XV.

What Flowers the Bees gather of.

P Sanctorius Thesaur. Arist l. 11.

IT hath been almost generally received, that Bees gather from all sorts of flowers, good, and bad, sweet, and bitter; some a little, and but a little straiten this vulgar position of all kindes of flowers, both of Herbs, and Trees (saith one) except Docks and Cheesrunnet.

Arist de hist. Animal. l. 5. c. 19.

Aristotle curtails this a little more, and tells us that they gather of all flowers that have cells or sockets. Mr. *Mouffet* straitens this also, saying, They refuse no flowers, that are fragrant, contained in cells, or sockets; but this also must bee narrowed into shorter bounds, as yet being too large, for of many sorts of such flowers, they meddle not with at all.

First, Bees gather not of flowers which have deep sockets, as Batchelors-buttons, Cuckow-flowers, Cockscomb, Jasmin, Cumphilly, Dead-nettle, Wood-bettony, Wild-blew-veare, Teazel Red-hony-suckle, rarely, and divers others, and yet these are more abundant with hony, than many that the Bees gather of. And of these the Humble bees gather plentifully, nature furnishing them with larger fangs, and longer tongues than the Bees.

2 Ordinarily they gather not of many little or small flowers, as Rubia, Pimpernel, Scorpioides, Hares-foot, Oliver, Veronica, &c.

3 Not ordinarily of many physical Herbs, as Erisamon, Agrimony

Agrimony, Century, St. Johns-wort, Mugwort, Mother-wort,&c.

4 Not of bitter Herbs, as Wormwood, Lavender-cotton, Southernwood,&c. yet sometimes of Rue, the flower whereof is scarcely bitter.

5 Not of very dry flowers, as Docks, Sorrel, Mercury, Atriplex, Wheat, Rye, Oats,&c.

6 Not of those that have a strong stinking smell, as Smalledge, Hemlock, Galopsia, Crown-empereal, Cheesrunner, &c.

7 Not of those that are soporiferous, and Narcotick as Mandrakes, Red-poppy, Night-shade, Black-briony,&c.

8 Not of those that are very cold and unctuous, as Orpine, Houseleek, Prick-madam, &c. for all oylie and unctuous things are hurtful to them.

9 Not of those that have a strong sweet smell, as Feverfew, Maudline, English Laurel, Myrrhe,&c.

10 Of very few flowers that grow in Ponds, or Rivers.

11 Not of those flowers, that (though they have great hollow bodies) shut hard and close at the top or lips, as it were, as Toads-flax, Snap-dragon, Fox-gloves, which the Humble-bees will open (being stronger) and gather of.

12 Not of very double flowers, as double Primrose, Wall-flowers, &c. except where the leaves are very fine, as the Dent-delion; nor of such as have deep sockets, and have no strings from the bottome to the top of the flower. Nor of such whose strings, or horns extend far out of the flower, as Avens, except there bee an excrescency, or cod in the middle of the flower, as Gillow flowers have.

Bees sometimes gather of such flowers, as are pernicious and hurtful. The Teil-tree, and the Boxe are very pestilential, so is also the Yew tree. Columel.

If they taste of the flowers of a Corneile-tree, they dye of a scowring, the blowings of Elmes are discommended, and wilde Cowcumbers, as also Woad, which affords a foggy food that over-lades the Bees, and makes them miscarry in the fields; strow Salt under your Hives, and they will bee the stronger and lustier. Tulipas kill Bees for closing a little afternoon, the Bees that are in them are imprisoned, the sides being out-bowing, and Plin. l. 21. c. 12.

ſmooth, they cannot get out, and will bee dead, before the next day when they open.

Sands relat. lib. 1.

The Lentick tree from whence the Maſtick is gathered, affords the beſt honey in the world, of which in the Iſland *Sio* (anciently *Chios*) is great plenty.

Bees gather of theſe flowers following, yet of ſome more plentifully than of others.

In March.

Haſel, Willow, Sallow, Enemony, Bunnikin, Daffadil, Violet, Gooſeberry, Cornelian, Miſſelto, Crocus, Elme, Primroſe, Pilewort, Dendelion, Spoonwort, Bears-foot, Black-thorn ſingle Wall-flowers, &c.

In April.

Ale-hoof, Ribes, white, red, black Oak, Peach, March-marigold, Cole, Turnep, Sycomore, or great Maple, Ribwort, Stockgillowflower, Cow-weed, Furſe, Strawberry, Broom, Beans, wilde white Enemony, Bears-ear, Ozier, Plumtree, Cherry, Pear, Apple, Crab, Barbery, Beech, Tear, Maple, Birch, Apricock.

In May:

Water-creſſes, Hull, Angelica, a tall rank graſs Parſnep, Onion, Leek, Garlick-ſeeds, Dogs-tongue, white Valerian, Tamarisk, Thrift, Sage, Storksbill, Mouſ-ear, Raſpis, Charlock, Marigold, ſmall yellow Honyſuckle, Poppy, Woodbind, Medlar, blew Valerian, Burnet, wilde Tanſie, Archangel, both with the white and yellow flowers, called by the *Tygurines*, Been-ſauge, or Bee-ſuck, Hawthorn, Elder, white Honyſuckle, King-cup, Peaſe, double Gies.

In June.

Tre-trifoly with yellow knops, and another kinde of Trifoly with long red bloſſomes, and a Trifoly with pale, yellow bloſſomes like a Lotus, but ranker, Dewbery, Blewbottle, Mothmulleine, Luteola, or Diers weed, white Briony, Savory, Origanum, Hyſop, Pondweed with a flowre like Patience, Lang dez beuf, common Thiſtle, Bugloſs, ſometimes, but ſeldome, Burrage, Parſly, Lotus, Liſimachia, Roſes, red, Damask, Velvet, Henbane, Muſtard-ſeed Sharewort, Canker-roſe, Daneſwort, Bindweed, Mallows, Melilot, Calamint, Cowcumber, Thyme, which onely yeeldeth Nectar. So Mr.

But-

Butler, who therefore findes fault with *Virgil*, for saying, *Crura thymo plena*, but let any obſerve, and hee ſhall finde they gather as often Bee-bread as honey; and again hee ſaith, The Bees gather not of the Roſe, the Primroſe, the Clove-July-flower, the Peaſe, of all which they gather plentifully, but not of the Peaſe untill the bloſſome begins to wither, and the cod to put forth, and then they gather Sandaracha of it plentifully, eſpecially in the morning. Mr. But. fem. mon. c. 6.

In July.

Tobacco, Love, Carduus-benedictus, Jacea, Lampſana, Penny-royal, Small Dentdelion, Scarlet Beans, Mayweed, Gourds, Clotbur, Live-long, Horſe-mints, Skirrets, Yarrow, Germander, Nip, Sowthiſtle, ſingle, and double July-flowers, Succory, Dill, Clematis Altera, Fenil, Filius Ante patrem, Holy-hock, French-marigold, Coriander, Lavender, Melon, Blackbery, Buck, Jacobea, Stechados.

In Auguſt.

Red Eye-bright, Knap-weed, Heath, Virga Aurea, Ivy.

In September.

You are to take notice that many of theſe flowers blow twice a year, as Roſemary, Archangel, Tamariſk, Burrage, Charlock alſo, although not the ſame roots. And ſome continue longer than the month whereto they are aſcribed, and ſome begin to blow a little before, but whenſoever they blow, the Bees gather of them, but leſs in Autumne than in the Spring.

Many flowers afford matter of gathering in the morning before the dew is quite exhaled, which in the heat of the day yeeld little, as the Peaſe, and a tall rank graſs, having a ſtalk a foot, and a half long, with a large buſhie ear.

Bees have this property, that whatſoever Flower they firſt begin with, when they goe to work, they meddle with no other that journey, but lade themſelves with ſuch meat alone as that kind yeeldeth; this is a common, but no catholique cuſtome, for I have often obſerved the contrary. Ariſt. de hiſt. Anim. l. 9 c. 40

It is true, if there be flowers enough near at hand, to make up their burden of that ſort they begin withall, they will meddle with no other, but if they have begun to gather of a flower that likes them, and cannot finde enough to furniſh them, then they wil make up their load of ſome other.

CHAP.

CHAP. XVI.

Of the ordering of Bees.

IN *February* lift up your Hives on the one side nimbly, and with a wing wipe away all the sharings of combs, dross, dung, or whatsoever else lyes upon the stoole, which although the Bees in time would performe, yet hereby shal you save them a great deal of labour.

If your old Stocks have any crumbling, or crispie combs, take them out in the Spring, for they cannot work to them; lay the Hives on one side, having ready a fire of dried Cow-dung in a Chafingdish without a flame, the smoke wil drive the Bees inward, and you may securely performe it.

Some tell us of putrefaction in the combs, in regard of dead brood chilled, which combs they would have taken out; but I never met with more than the Bees could rid themselves of, except when the Bees are almost, if not altogether starved.

Weckerus de secret. Lib 8. That they so love quiet, that they scarce endure the company of men (is false) and therefore must have walls built about them with holes, to see what offends them, is ridiculous, yet commended by *Florentinus*.

Bees are much offended with long hair on head, or face, let such therefore as must be often among them wear short hair, or be wel covered, on peril of stinging.

If a Bee have stung you in hot weather, your wisest and safest way is to depart for a while, for there issues with the sting a strong poysonful savour, which you your self may smel, but howsoever, the Bees wil readily, and knowing thereby that some of their company are wronged, wil with eagerness seek to vindicate the injury on whomsoever they finde present in the place, and come about you thick and threefold; there is no way to appease them but one, get away as fast as you can, and when the uproar is over, you may securely come again.

The best time to doe any thing about your Bees, is, in the morning before they flurre, or when they are new gone abroad, or in the evening, when they are returned from their work.

Virgil. Make the mouth narrow, least the Summers heat dissolve the Hony,

Dissolve the bony, or cold Winter freeze,
For both extreams alike annoy the Bees.

Be very careful about the doore, or entrance into your Hives, for negligence herein occasions the loss of more Bees than any other neglect, from the Dor-mouse, and Tit-mouse in Winter, and the Wasp, and robbing Bees in Autumn.

Let the doors be somewhat long, but very low, not much above the height of a Bee, and let them be more or less open, according to the seasons; but rather offend in leaving too narrow an entrance than too large; a thin board in Winter cut in notches like a grate, wel fastned to the Hive, with Cow-dung and Ashes tempered together; two notches open in Winter, is enough for a good Hive, one for a poorer; for thereby they are kept more warme in Winter, and more secure from enemies.

When they have wrought a week in the Spring, the better Hives may have three or four notches open, and by degrees more, until they be full, and then you may take away the grates altogether until Autumne; but be sure to set them early to the old Stocks that have over-swarmed, as also to the poore swarms, and in a dry year, sooner than in a moyst, for the Waspes wil be more numerous and early, and the robbing Bees finding little abroad to busie themselves about, will be seeking to plunder poor and weak Stocks betimes.

When you see the Waspes begin to be busie, and forsake eating of dead Bees, before the stooles, venter into the Hives, set up your doors to the poorer Stocks, and narrow the passage of the better with a little Cow-dung (tempered as before) that it may not be above an inch long.

If you will bee at cost, it will be very beneficial to have a hurdle made of Oziers set before your Hives, even with your stools, or else boards shelving outwards at the bottome, for the Bees to rest on when they come home weary and laden.

Mr. *Levit* misliкes the keeping of Hives four or five years at the most, but his reasons are weak, because (saith hee) the combs will be black and unsavoury, and the old Bees are not so good for increase and breed, as the young, nor so strong and lusty for labour; but these reasons are without reason, for blackness of the combs is no fault, as wee shewed before, and

of the age of Bees, wee shall treat by and by, onely in a word, note that they are an annual creature, and live not beyond a year with the vantage; on the same ground, therefore all the old stocks must be taken every year.

Many things are necessary for the preservation of Bees, first, A competency of food which they will labour for, and compass with their own industry, except the unseasonableness of the weather, the smalness of their numbers, the treachery of enemies, the power of robbers, or the covetousness, or simplicity of their owners by driving them too late, or after that by reiterated swarming, they have diminished their numbers, for the recruiting whereof, they were well enough furnished with brood (although then unfledge Nymphs, yet the hopes of continuance) of which being untimely bereaved by driving, as desperate, they either forsake their Hives; or if they continue and work, yet can they not sufficiently breed, and provide themselves before Winter, and therefore must starve.

It hath been inquired by some, what quantity of hony will serve a Hive of Bees all Winter: To which question no certain answer can be returned, because of the numbers which in some Hives are more, and therefore must have more meat; and also because the Spring in some years, is more forward than in another, so that quantity that will serve in one year, will not serve in another. But I would not willingly let any stock continue, that had not five pintes at the least of hony.

Sometimes it will bee converient to hoist up such swarms that you fear will cast, especially if Midsummer bee past, for although they may live, yet ordinarily they will bee weak and poor, and the stock whence they came so impoverished, that if it continues, it will scarce swarm the year following.

Raise them up by putting four Brickbats at an equal distance under the skirts of the Hive, let them go no further inwards than the verges, then dawb them up well, leaving a fitting passage for them to go out of the Hive.

I like Mr. *Southerns* judgement to set them down again afterwards, the best time is in *January*. This Mr. *Levn* laughs at as an impossibility, supposing that they having wrought down to the board, the combs would bee crushed together, and many Bees killed; but laying the Hive on the side,

and

and making a smoak (as before) in a cold morning, to drive the Bees up, with a long sharp knife cut the combes a little within the Hive (as I have often done) and there will be neither danger, nor damage.

Mr. *Butler* adviseth to set them down in the end of *August*, when by the death of the old Bees, and also of the Drones, there is more room made, lest their swarming bee hindred the next year, unless they bee swarms that have wrought down to the stool, which indeed most have, and then this advice is to little purpose. Mr. Butler Fem. Mon. c. 3.

The course in our Country which most take to get some profit by their Bees, is driving, out of a foolish pity they will not burn them, but care not much to starve them, and that without any great profit to themselves, for they usually do it after they have cast a second swarm about Midsummer, or a week after. The Bees then (besides those in the brood, which would have been a sufficient supply to them) being then very few, and many of them old Bees, which in a month, or a little more, will all dye, and then they will bee by much fewer; as soon as they are driven therefore, despairing by their own industry to subsist, they will leave the Hive and flye into another, so skipping for the most part, out of the Frying-pan into the fire. If they work, as some will endeavour their own preservation, yet not one of three in ordinary years out-live the Winter, and they being weak, are often made a prey to robbers in the Spring, or having spent their little store, then flye away; but if they out-wrastle all these difficulties, yet they will scarce swarm that year.

Moreover little hony at that time of the year is ordinarily to bee had; a quart, perhaps a pottle, and this is a liberal portion. Whereas if they will drive them, let them do it early before their hony is consumed by successive broods, and let them observe the condition of the Spring, for thereby they may have some likelihoods whether they will do well.

I have driven ten Hives in the beginning of *May* (not swarming the year before) all which after swarmed the same Summer, and the prime swarms did very well: Or if you will drive, take this course, when your stock hath cast a second swarm, the night following drive the old stock into the swarm, and they may do well, except it be late in the year.

Old ſtocks before they have ſwarmed, and early ſwarmes driven, ſeldome miſcarry; I have known them driven twice in three weeks, and full of hony the ſecond time. Nay a Scottiſh neighbour of mine drove a ſwarm the third time, and had above a gallon of hony at either of the two firſt drivings, and above three quarts the third time, but it was ſo late that the Bees dyed that Winter.

If you have a ſtock that lay out the year before, and ſwarmed not, and doth ſo the year following, and Midſummer be paſt, drive it, and ten to one (if the year bee indifferent it will do well.)

Now to preſerve your ſtocks, and yet to make ſome advantage of your Bees, take this courſe (except you know a better, but thus I do) About *Bartholomew-tide*, I ſurvey my ſwarms, and all thoſe that I finde not by the weight competently ſupplied, namely with five pintes of hony at the leaſt, I take, and I examine my old ſtocks, eſpecially ſuch as have ſwarmed twice, or oftner, and where I finde few Bees, which you ſhall know, if giving the Hive a little knock with your finger on the out-ſide of the Hive, if the murmur bee ſudden and ſhort, then it is a ſigne there bee but few Bees, but if it bee ſmart and long, deſcending from the top downwards, then it is a ſigne of plenty.

They that have but few Bees, though they bee never ſo well ſtored with hony, yet will not continue over the next Spring, but will bee a prey to robbers; therefore it is better to take them then to loſe them, and their honey alſo; but yet if you deſire to ſave any that are well ſupplied, then drive a ſwarm that you intend to take into them, and ſo ſhall you have a good ſtock; and thus with Gods bleſſing ſhall you increaſe your Bees, and have a ſufficiency of hony and wax. If you have not, you may take as many of the beſt as you ſhall think convenient.

Some preſcribe to take thoſe that are too full of hony, as (thereby) diſabled to breed, and proſper the year following. but this is but a groundleſs ſuppoſition for ought ever I cou'd finde, having had as good as any other, the combes being generally filled with hory to the board, which I have let ſtand on purpoſe to try whether they would breed, and never found, but ſuch were as full of Bees the year following, as any other; for after

after working time there is a long time of eating, and if they be numerous with Bees, they wil make roome enough by breeding time.

The manner in a word to take Hives in the latter part of the year is by burning, which briefly you may thus doe; take an old linnen cloath and cut it into long narrow peeces, about two handfuls long, and halfe an inch broad, and then having melted beaten Brimstone, dip them therein, and having digged a hole near the Hive that you intend to take, let it be somewhat more than a foot over, and half as deep; set in the bottome of it two or three crotched sticks, into which put three or four of your raggs smeared with Brimstone, and having kindled them set the Hive over, stopping the verges somewhat close, and your Bees with the smoak wil in a short space fall down stifled and dead.

For the manner of driving, it is needless that I should speak much, being wel known almost to every one.

Have a prepared Hive as near as you can, of the breadth, in the skirt, of that Hive you will drive setting it on the ground, put sheet over it, and wel fasten it with a strong pack-thread round about the Hive within an inch of the skirts, then having a Trivett, Payl, or Firkin ready, set the empty Hive therein with the mouth upwards, and then lift the Hive you wil drive, nimbly from the stall, and set it upon them empty, and gather up quickly the sheet that hangs down to the crown, and fasten it wel likewise with a little line, about an inch from the skirt, and turn them thus tied together, that the empty Hive may stand upwards, and knock gently with the palmes of your hands on the sides, and on the crown, sometimes in one place, and then in another, and often pause, and make a little stop, that the Bees may ascend, and reiterate your clapping againe; in half an hour they wil be all, or the most of them gone up, and then carry it to the place where the other stood; if you doe it in the evening, let it stand unmeddled with all night; if in the morning, let it be before Sun; and if there be any Bees behind, when you take out the combs, sweep them off with a wing, and they wil finde their fellows.

Many in the Bees necessity commend and applaud feeding, when by driving unseasonably, or not seasonably uniting (as the

Proverb is) *They have broken their heads, they would give them a plaister*, but for the most part too narrow and scanty for the sore.

For feeding of weak Bees, many things by many are prescribed, I shal be brief in the particulars, because I altogether dislike feeding, except in the beginning of the year, through the backwardness of the Spring, some Hives (otherwise sufficiently furnished) stand in need, or some early swarmes, the weather proving tempestuous, cold, or close, sometimes for above a week together: it wil be very convenient then to relieve them, until the weather alter, and they begin to work, when they wil need no longer your supply, and without a little supply would bee so poor and feeble, that they would untimely miscarry, and dye.

The ancients commend feeding of them with Raisins, bruised Figgs; *Pliny* bids set Hens flesh before them, although he acknowledgeth that they eate no kinde of flesh, and therefore in that respect preferres them before the Hornet, and the Waspe.

Mr. Hartlibs Legacy.

The Gentleman that wrote the first large Letter in Master *Hartlibs* Legacy, a wel-wisher to Bees, although little skilled, (as it appears by his Projects) in the nature or ordering of them, taxeth a general deficiency in this Kingdome in this respect, as if we were more negligent, or ignorant than some of other Countries; for the glory of our Nation let me plead (which he ignorantly traduceth)

The knowledge of Bees was never truly communicated to the World by any but by *English* men; Mr. *Southerne* brake the ice, then followed Master *Levit*, who wrote more than fifty years since: though he was published long after Mr, *Butler*: Mr. *Levit*, I say, not the Father of the publisher, but the Grandfather (perhaps his Grand-child knew not so much) and I question not but Mr *Butler* was acquainted with his Book, for it was in divers mens hands though not printed.

After him Mr. *Butler* wrote singularly wel (although in some things defective, and no question but after Ages may adde more, but I wil not be too bitter, not doubting of the Gentlemans good meaning, but advise him, and all others in this, or any other subject, not to urge Europian conceits, but such things

as

as out of experience they have some probable grounds for, *Ne sutor ultra crepidam*, all Countries produce not an equal store of every commodity; that other Countries abound more with Hony, is not because they abound in skil, *Scandia* is more plentiful, because after the great snowes that lye all Winter on the ground, and keep it warme, which once dissolved, the earth is presently embroidered with a garment of Flowers in greater plenty, variety, and continuance than most Countries afford; and the long dayes are another advantage, especially the weather not being so variable as with us, and a principal cause of their increase is the extreame cold in Winter, which holds them in a perpetual sleep, so that they eate little after they leave working, and the earth with the Winters Snow and Raine is thorowly moystned, that drought seldome proves injurious to them, as it is often with us.

But for his conceits of feeding Bees with sweet compositions of divers things besides Hony, because cheaper; we are to know, that although they wil eate of all kinds of sweet things, yet are they not so proper and natural as Hony, neither wil they when they stand in need of feeding extract Hony out of them, as hee supposeth, and repleniſh their Combs, no nor carry at such times Hony which they feed on into their Combs; and when they can doe this, namely, when they are lusty, and the weather warme, they rather gather it abroad (and save your cost and charges) but suppose those compositions were beneficial, yet not to the old Stocks that are likely to miscarry, for they for the most part have already more meat than mouthes, but yet it might preserve the swarmes.

I have shewed a cheaper and safer way, by uniting, and for casual wants, in regard of the continuance of cold and bad weather, Hony is more natural.

And whereas Mr. *Southerne* objects against old Hony, that it wil make them scoure, this is but a fancy, I yearly upon occasions experiment it, but never found that inconvenience.

He objects further, If they be fed, they wil fall to robbing of others, but herein also he was mistaken; Bees that stand in need of feeding are seldome so lusty, never so ventrous to plunder others, but rather in continual danger to be robbed by others of that little they have, which feeding, not duly performed, readily exposeth them unto.

The

The Gentleman in Mr. *Hartlibs* Legacy, desireth to save the poor swarmes by feeding, and with the least charges that might be, whereas not one of six (never so carefully fed) that are desperately poor, can be preserved, and if they doe live and escape the robbers, and not forsake their Hives, which most of them wil doe, finding their numbers small, yet will they not swarme if they live out the Summer, so that the charges besides the trouble will double the profit.

When you have occasion to feed, if you have not reserved Combs on purpose when you took your Bees, spread Hony upon a dry combe, and put it under the Hive in the evening, but remember to take it away in the morning, if any be left, or shut them up until they have eaten all, least the robbing Bees finde it, and not contented therewith, carry away also that little they have in the combes, I would have feeding begun (where it is necessary) before an absolute want, least they bee so poor and weak that they cannot come down; if any happen so to be, then turne up the mouth of the Hive in the heat of the Sun, or near a Fire, and drop a little liquid hony among them.

I have recovered swarmes shut in by long cold weather, where not a Bee hath been able to stirre, and continuing it after with a little hony put under the Hive until the charge of the weather, they have done very wel that year.

Bees wil sometimes suck the sweetnes of rotten Pears, sometimes full ripe Grapes, but yet a very few among a great many with us.

Fracnellus de reb. Siculis, lib. prior. decad. In *Sicilia* there be Grapes of which they make Muskatell, which are therefore called the Bee-grape, because the Bees greedily feed upon them, as also Fnes.

Mr. *Butler* counsels, that you cut asunder such Stocks as you intend to preserve (almost even with the Bees) if they have not wrought within a handful of the stoole, and then to set them down, making them a new door, that thus they may be warmer in the winter.

This is a course both wastful and uselesse, for I never had any stock, if it were supplied with meat, that miscarried, although the Bees had not wrought half way down. And to prevent it, in ordinary years fit your Hives according to the greatnes or smalnes of your swarms; This way, if otherwise profitable, cannot

be

be performed without destruction of your Hives, and the loss and trouble of your Bees, and the Stock wil be so small, that except you adde another, and raise it, the swarme wil be worth nothing.

To prevent the cold, daub up the skirts round, and let the entrance be very small.

A watering place near your Bee-garden is very necessary, they cannot subsist without it.

——But near pure Chrystal Springs, Virgil.
Green mossie Fountaines still your Bee-hives place,
And streams that glide along the verdant grasse.

Without it some say, they can neither make their Combes, nor yet their Hony; but the use is not so generall, but when they feed on Bee-bread (which is hot and dry) they cannot bee without it, and they love not to goe farre for it. Columel de re rust. 9 l. c. 5.

Into your running or standing water many prescribe to cast in stones, somewhat elevated above the water:

Into the Poole, whether it stand or flow, Virgil.
Great stones a cross, and Willow branches throw,
As Bridges for the Bees to stand upon,
And spread their wings against the Summers Sun.

But peeces of Wood, or Boards, entred into the water, and set shelving, or leaning towards the North are much better, the stones being too cold in the spring; but if you can bare the banks of the North-side of your Pond of all bushes, and grasse shelving towards the water, where they may drink under the Wind, and in the heat of the Sun, and suck it out of the earth above the water, which they rather desire, than to suck the pure water it self.

But if you have neither Pond, nor River within twenty rodds of your Bee-garden, set water in wooden troughs in your Garden, and have light thin moveable boards, or corks within your troughs, that may rise and fall with the water, let them have small clefts, or many little holes bored through them, that the Bees may stand on the boards and drink; keep Hens and Chick-

ens, especially Ducklings from these troughs, for they will destroy your Bees.

Mr. *Butler* enumerating the several actions of Bees in warme dayes in Winter, among others saith, they drink, but he was deceived, for although sometimes in *January* they gather a little Bee-bread, yet until they plentifully feed of it, they drink not, for while they feed on Nectar which is hot and moyster than Bee-bread, they need it not, but the other being more hot and dry, makes them exceeding thirsty.

Bees will be very much about sinkes, and where greasie water is thrown, nay they rather delight to drink out of Sawpits and holes where the water is thick and troubled, than out of Ponds, though nearer them; and when they water out of Ponds, they delight (as I said) to extract the water from the moystned earth near the Ponds, or Rivers brinkes, than to suck or drink of the purer water it self, which yet some will.

Mr. *Remnant* supposeth, that they suck out of sinkes, or old ditches, and places that incline to Salt-peter, for want of salt water, wherewith saith he they season their Hony, which I beleeve not, but rather that they may be more vigorous and lusty, and therefore salt is prescribed to be laid under weak Stocks; hee saith, it is in the defect of Salt water, but where they are near the Salt they use it.

And he further saith, they season their Hony with salt water, and in the want of it, with brackish water thus extracted, therefore he commends the setting of salt water or brine near them; but they neither use salt water about their Hony, nor yet fresh, (as *Columella*) but for the reason before mentioned,

In Summer they wil drink securely upon the Duck-sheard, and other thick weedes in the middle of Ponds; the best time to remove Bees, if you are to carry them farre is in the end of *January*, although if you be necessitated, you may do it well enough presently after *Michaelmas*.

A little before you take them from their standing, lift up a little the skirts of the Hive, and put three or four Tile-sheards under the Verges, that (the Hives standing somewhat above the board) all the Bees may ascend, otherwise some wil be left on the bottome of the stoole, which will be lost; then spread a sheet upon the ground before it, and nimbly take it off, and set it upon

upon the middle of the sheet, and gathering it up round, tye it close above the crown with a noose, tye it also about the middle with a Pack-thred, then put a Cool staffe through the noose (bee sure it bee well tyed) it must hang perpendicular, not swaying one way, or other. Let it bee carried between two to the place whither you intend it, when you come there, set it down, but open it not presently, for the Bees will bee somewhat disturbed with the motion, and ready to flye forth; it is best to set it up in the heat of the day, that if any suddenly flye forth, they may not bee chilled with the cold, but after a little flying about, they may return to it again; but if the weather bee close and still, then set it up in the evening, and stop it up close (leaving breathing holes) untill a faire day, and then open the door.

CHAP. XVII.

Of Bees breathing.

After a long condescension to the capacities of the Vulgar, to whom almost peculiarly this large practical Discourse appertains: I will now endeavour to set an edge upon, if not, to satisfie the appetites of the more judicious, though not with a banquet of Rarities, yet with a dish or two of Sweet-meats (according to promise) as soon as I can provide them.

There is a necessity of refrigeration from without, by aire or water. Now the grand inquiry is, How Insects (in particular Bees) are refrigerated. The Philosophers before *Aristotle*, held that all creatures breathed, as *Democritus*, *Diogenes*, *Anaxagoras*. Arist. de partibus Animal. l. 3. c. 6. Arist. de Spirat.

Pliny professeth that hee accords not with *Aristotle* in this particular, that Fishes breathed not, because they did hear and smell. Plin Nat. hist. l. 9. c 7.

I will speak one word to this (although out of my sphere) and but a word, lest I conjure up learned *Scalagers* ghost to oppose mee, That Fishes breath is evident to sense, I have seen them often come up to the top of the water, and a little elevating their heads above, draw it in with the water, and with

many bubbles return it again, some at the Gills, but the greater part at the mouth.

And that they cannot live without aire, thus, In great Frosts they cannot long continue though they have water, except the Ice bee broken, and then they will presently come to the hole for aire, so that sometimes you may take them out with your hands. And if it be some dayes delayed, they will turn up their bellies in the holes as quite spent, yet by the benefit of the aire, many of them recover, but if it bee altogether neglected, in a great Frost most Pond-fish will dye.

Rondel. de pisc. lib. l. 4.

Rondeletius holds, That not onely Fishes, but Insects also breath (although without lungs) in particular Bees, because of the sound, and murmure that they make, and because they smell.

Cardan. de subtil. l. 12.

Cardan affirms, That all living creatures breath either openly or secredly, manifestly such as have lungs, more hiddenly which have gills; and that is most obscure by palpitation, and therefore whereas *Aristotle* denies such creatures that have no lungs to breathe, hee understands thereby a perfect breathing, and therefore saith, The sound of Bees is caused by the aire, which they receive and draw in; why not the same instrument that draws it in return it? But this opinion, although *Aristotle's Scaliger* labours to undermine, but to little purpose. Hee supposeth it to bee caused by the shaking of their wings. This both *Aristotle*, and *Hesychius* before him propounded, but did not conclude of; Mr. *Muffet* saith, It is a secret not to bee determined of. The L. *Verulam* supposeth the humming sound of Bees (which is an unequal buzzing) to bee from the motion of their wings, because it is not heard, but when they stir, I deny not but the sound is more shrill and audible thereby, but not onely caused therewith.

L. Verul. silva-silvar. cent. 2. 275.

First, because in a Hive full of Bees, where they lye crowded up thick together in the Winter between the combs, without room to dilate their wings, not at all to shake them, you shall have a sudden smart sound in an instant from the place touched, descending to the bottome from all the Bees, as it were complaining.

Secondly, by the incouragment of the Queen Bee, when two swarms are united, and so mingled together, that either of them

them being encompaſſed with their whole troop, and having no room to ſtir, and ſhake their wings (being each of them in the center of their regiment) but as they are in the conflict moved with the whole body; yet may they bee heard audibly ſometimes a rod from the Hive a great while together, without intermiſſion, each encouraging her army to ſtand to her, and for her.

Thirdly, If their ſound were cauſed by the agitation of their wings only, it could not bee various and changed, but onely ſmaller, or greater, but both *Ariſtotle* and *Scaliger* acknowledge, that they change their voyce; and if they did not, yet is it ſo evident to ſenſe, that but coming among them, by their different voyces, it may bee known whether they mourn or rejoyce, work or fight. Ariſt de hiſt. l 9.c 40.

Fourthly, If their ſound were cauſed by the agitation of their wings, then according to the largeneſs of their wings ſhould bee the greatneſs of their ſound, but this is not ſo; the Queen Bees wings are no bigger than a common Bees, but her ſound is more than ten times lowder and greater.

I might adde that Crickets ſing, and their voyces are heard very far, and yet have no wings to ſhake; nay they move not their bodies when they ſing, as I have often obſerved, and as ſoon as they ſtir, they give over ſinging.

In a word, as to a Muſitian that playes on a Flute, or ſuch like Wind-inſtrument, there is required skilfulneſs in the outward touch of his inſtrument, and alſo wind to bee inſpired, without which hee cannot poſſibly ſtrike the ear, or pleaſe the ſenſe with any melodious noiſe, ſo do I conceive in ſome reſpects the humming noiſe of the Bees, is cauſed both by the outward motion of their wings, and alſo by an inward motion, that I ſay, not inſpiration.

Ariſtotle was very wavering what to determine concerning their ſound, ſometimes hee ſaith, they make a noiſe; ſometimes, hee grants they have a voice, and hee hath no ſooner granted it, but would fain bite it in again if hee could, as overthrowing this poſition, that they breathe not; Hear what hee ſaith, they change their voyce, when they ſwarm they have a proper and peculiar voyce, but whether they have a voyce or not, is not yet throughly underſtood in regard of the difficulty. Ariſt. de hiſt. l.9,c.40.

Thus is this grand Philosopher unresolved, it is a difficulty, hee cannot tell what to determine; but hee hath taken up another opinion, and although hee bee somewhat convinced of the vanity of it, yet hee is loath to retract, hee will rather set his wit upon the Tenters, and feign some new distinction, sometimes they make a sound, sometimes they have a voyce.

Arist de Spirat. Small and blood-less creatures are externally cooled by the ambient aire, or water, neither is it necessary that the air should penetrate them, because of the weakness of their natural heat; but the coldest creatures need refrigeration, for they have a heart, as the Snail, which is visible to all men upon dissection, and much more hot creatures, as Bees are, which have also a heart, although it bee not easily discerned by prejudicate eyes.

Arist. de Somno & Vigil. Winged creatures when they move themselves by the attrition of the aire sliding into their belly, make a noise.

Arist. de hist. l. 4 c. 7. And again, Insects have no voyce, but make a sound onely by the admission of the aire, not emission, and Bees, and all other Insects lift themselves up with their wings, and presently contract themselves when there is made a sound by the attrition of the aire taken in, but not constant to himself, hee saith in another

Arist. de Spirat. place, There is an innate implanted aire in the transverse inclosure, which being lifted up, and contracted, causeth thereby a smiting on the little membrane, and hence saith hee is their sound.

Scalig. com. in Arist. de hist. l. 4 c. 7. *Scaliger* saith, It is from a membrane including the aire, and the motion of the external members.

Magirus Physiol. *Magirus* saith, Their noise is not made by a return of the aire, but by an agitation of an inward not outward aire.

L. Verul. Silva Sil. cent. 2. 133 Another supposeth sounds, and therefore voyces may bee made without aire. It is certain, saith hee, howsoever it cross the received opinion, that sounds bee created without aire, though aire bee the most favourable deferent of sounds. Take a vessel of water, and knap a pair of tongs some depth within the water, and you shall hear the sound of the tongs well enough, and not much diminished, and yet there is no aire at all present. What if I should say there is aire in the water, because there is in it a sound made?

Arist. de Spirat. Hot creatures as Bees, desire a greater refrigeration: Bees like

like to those creatures that breathe, do make a sound (*spiritu*) with the aire or spirit, for when the native, which is (as before) implanted in the transverse enclosure, is lifted up and contracted, then is caused an attrition of the membrane; For they do not otherwise move this part, then other Animals draw aire with their lungs from without, and Fishes by the agitation of their Gills.

Scaliger is for transpiration; and so *Basil*, hee saith, That Insects breathe not, being without lungs, but were nourished by aire in the external parts, and his reason is, if they bee dipt or smeared with oyl, they presently dye, the passages or pores being stopt, but yet saith hee, If they bee presently washed with water (others say Vinegar) the passages being opened, they will live; and with him accord divers others. Basil Hexam. Homil. 8. Alexand. Aphrod. l. 1. Problem. 62.

To this I answer, That it is granted that oyl kills Bees, and almost all other Insects being naturally mortal to them, and wash them after with what you will they will, neither revive, nor recover, but almost as suddenly dye (though but a part of their body bee smeared with oyl) as if they were cast on hot embers. And that it is not, because of the stopping of the passages of the aire, appears thus: Let Bees bee drowned in honey, which is more viscous and clammy than oyl, yet if they bee timely taken out, they will dry themselves, or bee suckt dry by their fellows, and recover.

Now at last you cannot but take notice how various they are in their opinions, that deny breathing to Bees, or so to make a noise, they cannot but acknowledge a necessity of refrigeration.

Aristotle sometimes by the admission, not emission of aire; sometimes by a native implanted aire.

Scaliger from a membrane including the aire, and the motion of the external members.

Magirus by an agitation of an inward aire onely, but whether native, or adventitious, hee expresseth not.

L. *Verulam* sometimes, that a sound may bee made without aire, sometimes by the motion of their wings.

Basil that they are cooled by transpiration, and therefore by an aire so admitted, must make their noise. Thus wilfully deviating from, and denying a truth, they are quickly be-wildred in a thicket of errors.

Now

Aldrovand. prolegom. in lib. de insectis.

Now let us hear their arguments why they suppose them not to breath, *Aldrovandus* saith, Insects, neither breathe, nor need breathing, because a breathing faculty is bestowed on creatures which have lungs, but Insects being blood-less are cold, and therefore want not refrigeration, but are sufficiently cooled by a native aire, or externally by transpiration; I answer many of them (if any) are not blood-less, for they have a heart which the Philosopher accounts the original of bloed. And if they have a heart (*Aldrovand.* acknowledgeth) they have lungs also, and stand in need of great refrigeration. And that Bees are hot creatures, *Aristotle* affirms.

Arist. de Spir.

Secondly, If they breathed, as they drew in breath, they must also return it, which could not bee done but by some inward instrument; but all Insects are without bowels (according to *Aristotle*) but this is manifestly untrue; dissect a large Grashopper, the bowels are visible to him that hath but half an eye; and so also in Humble-bees, and in many other Insects.

In some that are very small, they are not distinctly visible; but it follows not therefore that they are without them, no more than because they want the visible organs of hearing and smelling, that therefore they neither hear, nor smell; both which senses almost all natures secretaries acknowledge to bee in them. And yet who is able to point out the instruments. *Aldrovand.* hath some other reason, but all built on the former foundation, which miscarrying, they must needs go to the ground.

Scal. de subtil. exercitat. 173.

Scaliger his main argument that they breathe not, is, because they need not a refrigeration of their heat having no heart; but this being manifest to sense, as learned Dr. *Harvey* avers, the argument falls to the ground.

Others deny that Insects breathe, and their reason is, because there is no breathing knot, or turning in the inward intrall, that is to say a membrane like to the lungs, whereby the aire is drawn in, and therefore some hold that they live as plants; but there is a great difference whether any thing breathes or lives. Others convinced of the vanity of this conceit, hold that they have something analogous, namely by transpiration.

Arist. de Spir.

Aristotle saith Bees breathe not, because they continue long in the water. But not long under the water; so long as by beating with their wings, they keep their heads out, they preserve

ſerve themſelves; but their wings being once thorough wet, they quickly drown.

And that they receive water into their bodies, appears, becauſe when they dye ſuffocated in the water, they are greater than when they are alive, whereas if they dye otherwiſe, they ſhrink up, and are leſs.

Ariſtotle, and alſo *Scaliger*, adde another reaſon, they will, covered with aſhes revive, perhaps if they have not been long drowned, with heat they will recover, as they will if they bee chilled near twenty hours, but aſhes are ſo far from reviving of them, that if they bee alive and luſty, they would rather kill them; for duſt (much more aſhes) will, if they go a little upon it, ſo fur their dew-clawed feet, that it will indiſpoſe them to flye. Idem de Spirat.

Breathing, ſaith *Scaliger* is ſeen by motion, or perceived by touch, by the pulſe, or underſtood by the voyce, and all theſe wayes more or leſs, may it appear that Bees breathe. Scalig. de ſubtil exercitat. 273.

But it may bee objected, that they have no noſtrils to receive breath by.

I anſwer, They breathe by their mouth, *Ariſtotle* ſaith, the mouth is for many uſes, for divers creatures do breathe with it. For breathing is not a proper work of the noſtrils, but creatures breathe partly by the noſtrils, partly by the mouth. Ariſt. de partibus Animal. l. 3 c. 1. Arist de Spir.

But it is further objected, wee ſee no lungs: I anſwer, in fowls the lungs are ſmall, and but like a membrane; ſurely then in ſuch ſmall flying creatures as Bees, they are not viſible.

But to conclude they have no lungs, becauſe wee ſee none, were but a weak arguing. In ſome creatures denied to breathe, we ſee them, and perhaps with a good multiplying glaſs, might ſee in theſe; by the ſame reaſon wee might deny they hear or ſmell, becauſe wee ſee no organs (as before) whereby they perform it, and yet nothing is more certain. Ariſt de partibus Animal. l. 4. c. 6.

That Bees breathe, Mr. *Butler* affirms, but it was a queſtion hee diſputed not, but relating how after they have been dead a whole day (being chilled with cold) although, ſaith hee, they be quite dead, without ſenſe, motion, and breath, you may, if you bee diſpoſed, revive them with the warmth of your hand (but look to your ſelves, for many when they begin to revive, will ingratefully ſting.) And this their reviving cannot but al- Butler Fem. Mon. c. 7.

most seem a miracle unto you, for presently their spirits returning, you shall see them begin to pant and breathe, and anon they will flye away as lusty as the best.

But to come to arguments, That Bees breathe is evident by their panting and palpitation; I mean not when they are in the condition of prisoners, and violently held or detained, for with *Scaliger* I acknowledge, that Bees or flyes captivated, palpitation is not breathing, but a striving to escape.

Bees when they return from their work are often so weary (as men out of breath) that they are necessitated to rest themselves near the Hive, untill they have recollected their spirits, and gotten, by a little rest, new strength, at first panting more quick and short, but by and by fetching as it were a longer breath, untill at last they pant little, if at all.

Secondly, It appears by their sweating at the Hive door, a moist vapour is visible at the door of a good Hive in the morning, sometimes in drops of water. As Bears in *Russia*, while they sleep in Winter, yet are found by the Hunters, by the dissolved snow turned into icycles on the boughs of the trees under which they lye, caused by their continued breathing.

Thirdly, because if a full Hive bee close shut up that no aire enters, they will quickly bee suffocated and dye; whereas indeed if there be but few Bees, they will continue the longer enclosed, a circum-ambient aire in the mean time refrigerating, and cooling them.

Aristot de Spirat. Fourthly, if you stop their throats, *Aristotle* acknowledgeth they will bee strangled.

Fifthly, when they are chilled with cold, lay them in the warm Sun, or near a fire, or if you dare venture, hold them in your hand, and you shall see them begin first a little to stir, then to pant, and the longer more strongly, untill they remit it by degrees as they recover life.

But I trifle out the time to prove by arguments to the ear, a thing so visible to the eye. Hold your hand near to the mouth of a full Hive, and that in the night when they are supposed to sleep, and not to stir, and you shall feel a cool aire come from them. Nay hold a feather, and you shall see it stir to and fro, as if it would be blown away.

Some

Some affirm, that insects have no blood, because they have no heart nor liver. *Pliny* was of opinion, that though they had no blood, yet somewhat analogous or equivalent, for whatsoever is the vital humor, is its blood. Learned Doctor *Harvy* in his anatomical lectures, openly affirmed, that Bees have a heart, (I heard him) which also hee hath since published, although Dr. *Primrose* will scarce acknowledge it, pretending his weak eye-sight, but this being asserted and confirmed by such undeniable experience, I readily subscribe they have a heart, and therefore a liver, and therefore blood, for the heart is the fountain of blood, and hath first blood, and Creatures which have blood have a liver.

Dr Har. exercitat. anatom.

Arist. de gener. idem de part. animal. l. 3. c. 4.

Aldrovandus citing *Aristotle* saith, all creatures have both a heart and also a liver, one for the Original of heat, and the other for the concocting of their meat, And again citing *Aristotle de partibus animalium* lib. 3. hee hath these words: *corde carens nullum animal unquam ortum est.* No Creature was ever produced without a heart: and there is good reason for this assertion, seeing the heart in *Aristotles* judgement is the Original of life, heat, blood, sense, and motion, and nature doth suppeditate breathing or refrigeration for the benefit or cooling of the heat in the heart.

Aldrov. prolegom. in lib. de insectis.

All Creatures which have blood have a heart, and why not, all Creatures which have a heart have blood? but in little creatures the blood is so obscure, that it cannot bee seen as in greater, but onely in the heart (not alwaies there) because of the thinnesse of the blood and the veins, are so little and small, that they can scarce if at all bee perceived, but the heart is the beginning of the veins, and the Original, and fountain of blood, and (as hee saith) the beginning of sense, for living creatures have the beginning of sense, where they have the beginning of motion.

Arist. de hist. animal. lib. 3 c. 10.

Arist. de somno et Vigil.

But yet notwithstanding all this, the liver and the heart is so farre from being the author and fountain of blood (which yet *Aristotle*, and all Physitians affirm) that the contrary plainly appears in the fabrick of the Chicken in the egg, namely, that the blood is the mother of the heart and the liver, which Physitians seem to confesse unawares, when they determine the Parenchyma of the Liver to bee a certain flowing of blood, as if nothing

Dr. Har. de generat. animal. exercitat. 50.

Idem in eod. lib. exercitat. 19

else were there but coagulated blood, and that the heart (saith hee) is not the author of blood, appears, because his substance or parenchyma is produced, sometimes after the blood, and is superadded to the beating vesicles.

Now seeing it is so apparent that Bees have a heart, then it must follow necessarily, that they must have lungs also (which *Aldrovandus* grants) that these receiving and returning aire may refrigerate the heart, now the lungs receive the Original of their motion from the heart, and with his fulnesse and emptinesse as it is contracted and enlarged, makes way for the egresse or ingresse of air, when it is lifted up, the air comes in, and when it is contracted it goeth forth.

Arist. de Spirat.

That some insects have lungs, *Aristotle* doth implicitely grant, for hee saith, *pulmones habent quæ in lucem fœtum jam conceptum proferunt*; such creatures have lungs which bring forth a living creature conceived in them. Now that some insects do so, is undeniable. *Scaliger* affirms it of a certain sort of flie, of which wee spake before, and it shall bee further confirmed by a discourse of the claw-tailed humble Bee, when wee speak of Humble Bees.

Scalig. de subtil. exercitat. 191

CHAP. XVIII.

Of Bees temperature, Sleep, &c.

Nicol. us Leonic. sin quæstion. natural. 43

Aristotle affirms most insects to bee of a cold temper, his reason is, because they breathe not, and to this N. *Leonicus* subscribes, and saith all insects need little food, because they have small bodies, and therefore are satisfied with little, or rather saith hee, because they are cold and bloodlesse, now creatures which are hot, desire much refreshing, and quickly digest what they eat. So *Aldrovand.* Insects are sufficed with little meat, not so much for their smallnesse as their coldnesse. That this may bee true of some I will not deny, but not of Bees, they are hot creatures, and desire much refreshing, and quickly digest what they eat. Indeed they are very liberal feeders; whosoever shall observe the abundance of Bee-bread that is daily brought into a good hive, which they spend almost as fast as they

Aldrovan. præf. gen. in lib. de insectis.

Arist. de Spirat.

they get (besides honey) and also considers, how much they eat abroad when they gather, cannot but acknowledge that they are great eaters. And *Aldrovandus* upon experience affirms, that many insects are hot, and Bees in particular, and his reason is, because they grieve and violently pain those that they sting. Insects have been noted by the Ancients to feed little, but this hath not been diligently observed, for Grashoppers eat up the green of whole Countries, and silk-worms devour leafs swiftly, and Bees eat in great quantity according to their bodies; which is evident to any that shall observe, what store they carry daily into their Hives, and what little increase there is sometimes, after three months laborious constant working. L. Verul. Silva-Sil. cent. 7. 697.

It is true, that creatures that sleep and rest much, eate little in those times, as Bats, Dormice, and Bees, But saith *Cardan* it is necessary, that Creatures that sleep much, feed much, and by the vertue of the meat formerly eaten in abundance, subsist when they sleep. Card. de Subtil. lib. 9.

All creatures almost, more or less sleep, yea insects sleep *somno tamen breviuntur*, but they sleep but a little saith *Aristotle*, surely if at all a great deal, the brain is chiefly the cause of sleep, and such creatures as have not a brain sleep not. Bees sleep saith *Aristotle*, and hee proves it because they are quiet, as hee saith, all night and make no noise, and they cease not from motion, because they are weak sighted and not able to move, bring a light they stir not, saith hee, but this is false, for they will flye after and into a Candle, or light, like a moth, and burn themselves, but suppose they did not stirre with a light, yet were the argument of no force, they stir not at a light, and therefore sleep, for wee know that many fowls are taken in the night with a light, at which they stir not, although they bee awake, because they see nothing beyond or beside the light. Arist. de Somno et Vigil. Arist. de somno. Idem in eodem. Plin. nat. hist. l. 11 c. 37. Arist de Hist. l. 4. c. 10

That they sleep from the beginning of winter to the rising of of *Arcturus* sixty dates together, and eat nothing at all as *Pliny* affirms, is not true with us, perhaps in Northern Countries, where the cold is more intense, they feed little, and sleep for a longer space, which is a principall reason of their so great plenty of Hony. The more temperate winters with us, occasion if there be not the larger provision, a great decay of Bees. For every warm

warm and sun-shine day, they will flye abroad, and play, and empty themselves, and thereby getting good stomacks return home and feed: whereas gloomy cold and close weather, shuts them in and saves stover, and therefore a smaller proportion will sufficiently supply them untill the gathering season.

That they sleep when they are abroad out of their Hives (on their backs) is a ridiculous fable, least the dew should wet or prejudice their wings, and hinder their flight when they awake, as *Aldrovandus*, and other deliver from the Ancients. And suppose that they should observe this course, yet could they not accomplish their purpose, for from the vapour arising from the earth their wings would bee as much if not more wet, then if they should rest on their feet: how soever their wings being slimy and (as it were) unctuous, the wet would not much stay upon them.

Aldrov. de insect. lib. 1

Concerning the age of Bees, diverse have been the opinions, some giving them a longer, some a shorter life, *Aristotle* saith, they live six or seven years at the most. *Pliny*, that they never exceed ten, no not by succession. *Columella* also saith the same, *Cardane* saith; strong Bees may continue twelve years. Mr. *Remnant* saith, if they continue in health three years, they may stand twenty, *Mouffet* supposeth, that if they be well cared for, and cured of their distempers, they may live thirty years, and tells us that at *Hanworth*, hee knew a stock continued in the seeling of the house of the Dutchesse of *Somerset* more than three decads of years, and swarmed four times almost every year and therefore doubts with *Alberius* whether they ever dye of age.

Arist. de hist. anim. l. 5. c. 12
Plin l. 9. c 3.
Cardan de variet. rerum. c. 28.
Mouset. theat. insect. Li. c. 3

The truth is, notwithstanding these mens opinions, that Bees live but a year and a quarter at the most, for those Bees that seem in *May* lusty, full, brown, smooth, well winged, will by the end of *July* following begin to wither, become lesse, look gray, and have their wings tottered and torn, and bee all dead before the end of *August*. And although their life seem short, yet is it more then double to the Droans, but by succession they may continue many years.

Now what is to bee said concerning the life of the Queen Bee, it is a quere never propounded by any (for ought I know) for

most

moſt men concluding that the Bees live many years, have ſuppoſed the Queen Bee to continue as long, and her life to bee of an equal extent and date with theirs. Mr. *Butler* that firſt publiſhed the Bees to bee birds of a years continuance, and ſomewhat more, yet ſtarted not this ſcruple.

It is well known, that ſome Hives continue ten, nay twenty years, and more, what ſhall we ſuppoſe of the Queen Bee, doth ſhee ſurvive ten, nay twenty generations; or how comes there a ſucceſſion of Rulers? I have propounded a queſtion, wherein I ſhall ſcarce ſatisfie my ſelf, it is not ſtrange therefore, if I leave others unreſolved.

It is manifeſt that the Hony Bees are but yearly creatures, and the reaſon of their ſhort life is their unwearied labours, by daily flying abroad, inceſſant working, and ponderous burdens, they waſte themſelves, and wear their wings, which could they renew as the Eagle her bill, they might for ought I know live many years. Now the Queen Bee not working at all, ſeldome flying abroad, and then not far, not ſo much in a year, as a Hony Bee in an hour, never tears her wings, waſtes her ſtrength, nor makes her ſelf old with labour, ſo that it is more than probable, that ſhe may live many years.

Otherwiſe you muſt ſuppoſe her miſcarriage ordinarily to be, when her Infants are in their prime, and not departed from her, the elder being able, and ready to ſucceed her, for if ſhe ſhould miſcarry at other times before their birth, or after their Butchery, the whole ſtock muſt needs miſcarry.

CHAP. XIX.

Of Bees fighting and robbing.

BEes when they are abroad at their work, or remote from their Hives and common treaſure, are very gentle and peaceable, ſo that in their private wrongs, how ever you uſe them, they will not reſiſt, if by any means they can get away, ſometimes at their waterings they will conteſt one with another, but are quickly quieted, and parted, whereas at their Hives they are fierce and furious, they will neither give nor take quarter. Ariſt. de hiſt. lib. 9. c. 40.

Upon

Upon the union of two swarms, sometimes (but it is rare) there is at first, especially if the companies bee somewhat equal, a violent charging each of other, and the Leaders (for other extraordinary Trumpeters have they none) with a shrill and loud noise animate and encourage their several companies boldly to stand to it, and not without cause, for it is their safety, or destruction that all the conflict is for, and as soon as they conclude who shall govern, which for the most part is determined in few hours, then they will all cheerfully as one body, live and love together.

Aristotle writes of certain Serpents in *Mesopotamia* which do great mischief to strangers but do no hurt at all to the inhabitants: And Mr. *Herbert* tels us, *Cashan* in *Parthia*, is much infested with Scorpions, but a finger long, but of great terror in the sting, inflaming, such they prick with their invenomed arrow so highly, that some dye, none avoid madness a whole day, but which is remarkable, they never hurt a stranger; but Bees irritated near their Hives, are at equal enmity with strangers, and domesticks; such as are daily conversant with them, if they bee but a little provoked, shall finde no favour, so that no creature is so violent and revengefull; but although their spight and malice in their rage is as much to men and beasts, as to their own kinde, yet seldome do they work an equal hurt and mischief; and indeed the opposition is bittereſt between those that are neareſt, for there is a special implacable hatred.

Mr. Herbert.

Avicen.

When two swarms settle together, and eagerly bid defiance each to other (this falls out seldome, yet sometimes) alwayes expect a martial and deadly skirmish.

When a company with their Leader forsake their own Hive, and enter into another, their difference is irreconcileable, their hostility unappeaseable, but by the death of one of the Commanders; for things that are in their nature contrary, can never be reconciled, as two Commanders in a Hive.

And grapling so in clusters head-long fall
Hail from the Winters sky falls not so fast,
Nor shaken Oaks so thick dispersed their mast.

Virgil.

I had once two large swarms, that rose almost immediately one

one after the other, and before the first were fully setled, the last came and setled with them; and began presently to kill each other most desperately. As soon as I had notice of it, I caused them to bee hived that were yet alive, half being slain in little more then a quarter of an hour; but the remainder being hived, yet ceased not their quarrel (although I threw strong drink upon them, and did what I could to appease them) yet they still continued the battel, that before night there was not above a pinte left.

But although two companies upon their congress and coming together with equal forces bee thus desperately cruel; yet when they rob, and plunder, they shew less rage and ferity, but are not less mischievous and hurtful.

Bees are the most dangerous enemies to Bees, they have many other, but none so hurtfull.

Some are too favourable in their censures, and clear them from robbery. Bees, saith *Aristotle*, hunt after nothing, but labouring painfully, gather all they possess. And *Scaliger* gives a reason for it, because they feed not on flesh, nor hunt abroad to plunder other, and therefore expect a reciprocal carriage from others; but by his leave, no greater robbers of Bees, than Bees, so that though hee return an *Ignoramus* to this bill of robbery put up against them, yet upon better evidence I must finde it.

Arist. de hist. Animal. l. 9. c. 64. Scalig. com. in loc.

The greatest danger that befalls the Bees, comes where it should least come, from the Bees themselves. Bees are loving and sociable creatures, and therefore wee might think should converse one with another in love and peace; but instead of support and protection, they do finde ruine and destruction from their own kinde.

Pliny saith, when their provision fails, they invade their neighbours and rob them; they fight not then for their right, but to get a booty, and under colour of warring, make a trade of robbing. And another saith, When they want meat, they forcibly rob their neighbours: but the matter is quite otherwise, for usually the lustiest, and the best stored, that need nothing, will bee first prying into their poor neighbours weakness. They set not upon an empty Hive, seldome upon an ill furnished Hive, but upon some well provided stock, where the fatness of the booty is a fitness to their desires.

Lilii Greg. Gyrald. t. 1.

Remisse opposition provokes fiercer attempts, they are impudent when they meet not with bold resistance, only resolution can make them give back, give over, they will make many tedious and fruitlesse onsets, as if the strongest fort were not able long to hold out.

They first come with a few and make an assault, and by the opposition conclude the issue, but still renew their numbers, and although they loose many in the conflict, yet will they persist, and not prevailing that day, will the next morning before the true Bees bee stirring, venture in, and if the opposition be not the more resolutely maintained, they will come so numerously, as waters at a breach, that resistance is to no purpose, and then they do fall to plundering, going and returning untill it bee dark, if they have not carried away all before; and so continue till they leave not a drop of honey; to whom often the true Bees (seeing their condition otherwise desperate) will joyn themselves, and accompany them to their Hives, and help to carry away their own goods.

As long as the opposition lasts, they are very fierce, and untill they have overcome, mercilesse, but having once made a forcible entry, they quickly give over killing, and fall to plundering.

Sometimes many stocks will bee up in arms together, and then it is no easy matter to compose and quiet them.

Virgil.

Wouldst thou this fight and furious heat allay;
A little dust thrown up will part the fray

Yet this often avails little, it is better by prevention to avoid it, by narrowing their doors when once mid-*July* is past, that but a Bee or two may enter at once (understand it of the poorer stocks) but if this hath been neglected, and they bee together by the ears, then make a smoak of mulch and wet straw, and throw water about the Hive door where the greater conflict is, straitning the passages of those that are robbed sometimes (if the skirmish bee violent) stopping them up close, and throw water upon those that eagerly seek to enter, and in less than an hour finding no entrance, and trouble without, they will return home. After sunset open them, and all the robbers that are

are alive will go to their own Hives. Examine their state after the robbers departure, and if you finde but a few Bees, it will not bee worth your labour to trouble your self for their preservation, for at one time or other they will bee robbed, if not, they will never thrive.

But if there bee a considerable quantity of honey still left, and also of Bees, then stop them up again close, allowing them aire through a quil; but bee sure you stop them up very well, for in the day time they will bee gnawing and mineing to make a hole out, and the robbing Bees will bee ever and anon visiting the door, to see if it bee open, which if they finde (if you do not presently stop them in again) the last danger will be worse then the first. After sun-set allow them a passage to go forth, to take the air and empty themselves; take this course sevea or eight daies, and when you give them a free passage in the day, let it not bee untill nine of the clock, and the first and second day that you open them, stop up their enemies, that they may not trouble them who are not lusty, as at the first by shutting in, and in eight days their enemies will forget them,

Some prescribe to cast flour on the Bees that you let out, that so you may know the plundering Hives, which you may easily otherwise, but if you do not, take this course, and observe whither they go, when you once know the robbing stock, with a long pen-knife, through the Hive, cut the combs towards the top, that so they may find work at home to stop up what you have broken.

Although they will not admit of strange Bees in their Hives, yet diverse stocks will conspire together, and agree well to undo their neighbours: and usually like the fox they prey furthest from home, seldome robbing their next neighbours.

The chief times of robbing are Autumn and the Spring: usually about the end of *August*, but in dry years, about a fortnight before, when the honey gathering is almost over, then do the lustiest (being most numerous in Bees) practise it on the old stocks, such chiefly that have overswarmed, and have but a few Bees left: on such also as have lost their Leaders, who are careless to resist, and will quickly go along with them and help to carry their own goods. There is no way to save such, but as I prescribed formerly.

Another time of robbing is in the spring, and then those poor old stocks that escaped in Autumn must bee carefully watched, poor swarms also shall now bee tried, until the year grows up, and the flowers bee plentiful.

Let all such have (as I ordered before) very narrow doors; swarms are more difficultly prevailed against then old stocks; for though perhaps they have not wrought down to the board, and so the entrance be more easy, yet being usually more multitudinous, they will hold out longer: whereas old stocks although they have more provision, yet have fewer souldiers, and therefore are quickly overcome and plundered, and more easily in the spring then before.

Once, if you perceive, that waspes in multitudes, or robbing Bees have made a breach into an old stock, delay no longer, but take them, for although by your circumspect care in stopping them up and narrowing their entrance, you may prevent their present destruction, yet will they not escape in the spring: but if it bee a swarm, there is some hope, that by your care, you may prevent their present and future destruction.

CHAP. XX.

Of Bees, Enemies and Sicknesses.

ALl Common-wealths are infested with enemies, and the Common-wealth of Bees as much as any other. Wee have already spoken of the worst, namely Bees.

In the next place let us treat of Mice, which are also very hurtful and destructive. Sometimes they get in at the door, when it is left too large and open, sometimes they make their way through the Hive, most commonly near the crown of it, and they are no sooner in, but they presently share down the Combs, and eat the honey; and if they be let alone, will often make their nests among the Combs. To prevent them, bee carefull of the door; often, especially in the winter, view your Hives. If you see any crumbles of wax at the door, bee sure there is something amiss, look therefore warily, and keep traps baited about your stalls.

Waspes

Waſpes in Harveſt do great miſchief, ſometimes deſtroy whole ſtalls. At firſt when they are new come, they content themſelves with dead Bees; but after a while they grow bolder, and venture into the Hives, and moſt of all in the cool mornings when the Bees ſtir not. And after they have found the way they will never give over, but invite their fellows, nay, they are often the robbing Bees harbingers, who make an end uſually where they beginne. And although there bee an antypathy between them and Bees, yet will they readily joyn together to plunder the poor Hives. They are naturally hardier and ſtronger than Bees, one waſpe will often violently break away from two or three Bees, yet many of them come ſhort home, being ſlain in the Hives by them.

In the ſpring at your watering troughs, or other places where your Bees drink, and on the ſouth-ſide of your pales, you may ſee the mother Waſpes, drinking or gathering kill them if you can, and know that you deſtroy as many neſts as waſpes, for every mother Waſpe makes a neſt. After when they have bred let their neſts bee ſought out, and deſtroyed, burn them or ſcald them; or (which is ſooner done) in the evening with an iron ſpade (having before obſerved which way they go) ſeek for their neſt by putting it into the ground, and you ſhall know when you meet with it by the hollownеſſe, then looſen the earth round and ſtamp it in. Set glaſſes with ſtrong worte, ſweetned water, or ſweet fruit: or rather pots covered with a paper, with a hole in the middle, and that is the beſt way, for in the other the Bees will be often drowned.

The Hornet is as hardly cenſured as the waſpe, but ſhee is nothing ſo dangerous; ſhee now and then eats a Bee, but the waſpes deſtroy whole Hives, her manner is to flye about the Hive, and when ſhee ſeeth a Bee reſting her ſelf upon the ſtool, ſhee preſently ſeizeth upon her, and carries her away in her feet, as the Hawk doth a bird. Deſtroy their neſts if you can without danger, if it be no large hole, in the evening having made a woodden plugge, ſuddenly knock it in, and you are ſure of them, or ſet lime twiggs before their holes, and thereby you will much diminiſh their numbers.

The Titmouſe is more hurtful then the Hornet, I mean the great Titmouſe called a Colmouſe, with a black head, for ſhee

will eate ten or twelve Bees at a time, and by and by be ready for more; she feeds her young ones also with them. She eates not the whole Bee, but divides it in the middle, and pulls out the bagge of hony with the entral, letting drop the skinny outside.

When she comes to the hive and findes none, she knocks with her bill at the door, and as soon as the Bees come out to enquire the cause, she catcheth first one, and then another, until her belly be full; in the Spring she watcheth for them in the Willow and Sallow Trees, and takes them when they are at their work. Destroy their Nests in breeding time, and shoot them in Winter.

The Spider is a great devourer of Bees, if the Hives bee empty, or have but a few Bees, shee will make her webs within: but for the most part if it bee a penthouse, shee lies between the boards where they fold one over another in the day. And in the night shee weaves her nets right before the Hive, wherein the Bees are quickly ensnared.

Virgil. ——— *Close*
About the door her net-like cobwebs lose
The Pallas hated Spider Spins.

Kill the Spiders if you can come at them, and in the mornings beat down their nets. Many also spread them in the flowers, and among the brambles in the hedges, and they lye in ambush in the cod or center of them out of sight, and no sooner doth a Bee or flye strike them, but they are upon them and kill them. They will grow quickly greater then large Pease by eating of Bees.

The Woodpecker is by many indited, I think not much guilty, yet I will not discharge her.

The Swallow hath an ill-name, but I could never observe any great hurt done by them.

Chaucer Assembly of Fowles. *The Swallow mordresse of the Bees small,*
That maken hony of flowers fresh of hue.

The

The Moth with her mealineſſe ſomewhat offends the Bees, but except the Hive hath very few Bees, or be altogether empty, ſhe doth no great hurt; yet then ſhe will lay her blots in the Combs, which will ſpoil and conſume them all. Ordinarily ſhee breeds her young by the heat of the Bees under the skirts of the Hive, and the dawbing ſnails will ſometimes creep into the Hives, and much trouble the Bees with their coldneſſe and ſlimineſſe.

The Toad is thought to bee dangerous, though ſhee doth but lye under the ſtool, and ſometimes to deſtroy them, as the Frog when they drink, but I never obſerved it.

The Piſ-mires are often very hurtful, troubling the Bees, and devouring their hony, ſcald them in their neſts, and tarr the places where they uſe to aſcend. *Albert.* ſaith, mountain *Origanum* dried and beaten to powder, if it be ſtrowed on their neſts, makes them to forſake them. Albert. de mirab. mundi.

If the Ants holes be ſtopt with *Heliotropium*; they wil certainly dye. Mizald arcanorum l. 1.

Bears in ſome Countries do greatly endamage the Bees, and Bats, thoſe that breed in trees, ſeldome are injurious to thoſe in Hives.

Sparrows feed on Drones, but meddle not with the Bees. At firſt I was ſuſpicious that they deſtroyed the Bees; taking notice therefore of their often flying to the Hives, and from thence to their neſts; I cauſed the young to bee taken, and found their crops full only of Droans.

Ferrets delight in honey, and therefore ſpoil Bees, but this *Scaliger* denies, for hee ſaith, that he hath offered them honey, but they refuſed to taſte it. Arist. de hist. lib. 9 c. 9. Scal. com. in loc.

In *Guinea* are many Bees, but all wild, breeding in trees, and receive much hurt from a kinde of great black Ant, which make holes in the earth like field Mice, and much damnify the Bees by eating both hony and wax. Pur. Pilg. 2 part l. 8. c. 2.

In the Countrey of *Sofala*, there is a bird called by the Cafers *Sazu*. It is of the bigneſſe of a Linnet, and almoſt of the ſame colour, with a long Bill. The chief food of theſe Birds is wax. They ſeek about the woods for ſtocks of Bees: And when they have found one that hath honey, they Jovordos Santos livero pin. di Ethiop. oriental c 24.

they come into the waier to seek for Passengers to shew it them; which they do by crying before them, and beating their wings from bough to bough untill they come to the Bees. The naturals who are acquainted with their manners, presently follow them, to get the honey. And the advantage that these birds get is to eat the wax they leave, and the dead Bees. They will come into Churches at the windows, and if they find wax candles, eat them.

Purchas Pilg. fourth part, l. 7. c. 1

The Hirara is like the Civet-cat (though some say it is not) they are of many colours, *viz.* gray, black, and white, They eat nothing but honey. And in this they are so terrible, that let the hole of the Bee-hive bee never so little, they make it so big that they may get in, and when they finde the honey, they never eat it, until they have called their yong ones. And then the old one going in doth nothing but bring out the hony, and give it to the young ones. A thing of great admiration, and an example of great charity.

In the Island of *Barbadoes*, and the adjacent Islands, are certain birds bigger than Sparrows, with a very great head, called by the English Logerheads and Counsellors, they live naturally on all sorts of Flies, and are great destroyers of Bees, for they have made a total destruction of all that have been carried thither.

Palladius de reruſt. l. 1 Columel. Isidorus Hispalen, lib. 12 Etymol. c. 8

Crabs burned are hurtful to Bees, and also the smell of dung, and places subject to Eccho's, for Eccho's and great noyse much exasperate them.

There is no such creature called Clerus (as some) bred by Bees, Moths are bred in the combs where are few or no Bees, in lusty hives they are bred under the verges or skirts of the hive, but gererated of Moths, not of Bees, as *Columella*, and from him *Aldrovandus*.

I. Milesius religio Boruſſor. Huldrichus Schimdel.

The Martins in *Russia* live for the most part on the tops of Trees, and greedily devour the Bees.

The Crocodile is much delighted with, and desirous of hony, Saffron is their antidote or preservative (which it seems he can not endure) to safe-guard the Bees.

The dung of Poultry is supposed to be very offensive to Bees, but I have not taken notice of any such effect, although

though I have observed in several places, that for shelter the Hens would repair to the Hives (such as stand under Penthouses) and dung among them, howsoever (if you can) keep them away, and be sure to let no Hens sit under the Bee-boards, for the Bees wil sometimes come to them, which the Hens wil catch in their bills and kil; which other Bees smelling wil seek to revenge, but with their owne destruction; I have knowne above a quart of Bees killed thus by a Hen in a little space.

Lightning, especially Thunder affrights, and much disturbes them, saith Mr. *Mouffet*, and to confirme this tells us, that in the moneth of *August*, one thousand five hundred sixty six, being with the Dutchess of *Somerset*, desperately diseased, suddenly, (on occasion of a stroke of Thunder) under the next Bed-stead, he and others heard a murmuring and shril noyse, but at first knew not that Bees were housed in the seeling of the roome, underneath where they had inhabited thirty years. Mouffet theatrum insector. lib. 1.

And the day following (for want of sleep, as he supposed) flew up and down trembling, and making more than ordinary noyse, and in a distracted manner struck themselves against the windows, were extreamly provoked against the Family more than at other times, so that they are impatient of fear, as he concludes; as also of disturbance by night, when he saith they all sleep, and not at all by day; when indeed they sleep not all, for some watch, and make a constant buzzing (in full Hives) all hours of the night, until Autumnes cold forceth them up within the Hive, and makes them to lye close compact together among the uppermost combes; yet then (if they be asleep) they are presently awakened, not only with the least touch on the Hive, but of the ground near it. Nay, if you breath before the Hive, though at a yard distance, they wil presently come forth with a great noyse to examine the cause.

Snow is very hurtful when it dissolves with the heat of the Sun, for the Bees with the heat wil be tolled out of the Hives and they are no sooner forth, but they are dazled, and blinded, and cannot finde the way in again, but flying a while up and down being weary, think to rest themselves on the Snow, which they no sooner touch but they are killed; be sure therefore at such times to shut them in.

Sharp frosts, nipping blasts, chilling aires, drisling fleec, boisterous and cold winds, in the Spring, are very prejudiciall for the Bees, coming home weary and laden, are beaten down after in multitudes, and (unless the Sun shine out presently, or the winds calm) never recover the Hives. Let your Bee-garden be well defended (take heed of an eddy wind from some house or building) and let them stand low; I have observed, that out of six Hives, standing two foot high, and in the eddy of the wind, I have lost more Bees (being beaten down, and miscarrying on the cold ground, then out of sixty Hives, standing not much above a foot from the ground.

Arist. de hist. Animal. l. 8. c. 32.

Bees are sick in dry years, and in such times when the flowers are blasted. Concerning Bees sicknesses, hear what *Virgil* saith.

But if their bodies bee diseased (as Bees
By life are subject to ever maladies)
Which may by signes infallible bee known;
The sick streight lose their colour, and are grown
Deform'd with leanness; they in woful wise
Bear forth their dead with solemn obsequies,
Or cloister'd else within their houses they
Sadly contain themselves, or lingring stay
About the door, in clusters taking hold,
Famish'd, and faint, and feeble by the cold.

Columel. l. 9.

The murrain among Bees is very rare: other diseases they are subject too, especially to a scowring, by gathering, or feeding on Tithymal, and the blowings of the Elm, and therefore in those parts of *Italy* where there are many Elms, there are but a few Bees. I deny not but the gathering of the Elme may bee dangerous in *Italy*; but I am sure in our parts, which are plentifully stored with Elms, they are no way prejudicial: Indeed they seldome gather of them.

Much ado is made by many Authors concerning Bees sicknesses, and the remedies. They tell us that they are subject especially to a *Cacochymia*, *Blapsigonia*, *Marasmus* and *Diarræa*. Whereas in all my long observation, I have found no proper sickness; accidentally indeed, when they are necessitated for provision

vision, or not well defended from winds and wet, they have an ill digestion, because they have little to eat, and they lose their brood, because they have not wherewith all to feed them; and their natural heat is wasted for want of meat to maintain nature; and they have sometimes a scowring not having meat proper and good for them, they then will sometimes gather of purging flowers, which doth not strengthen them, but make them more faint and weak.

And yet to all these various effects proceeding from one and the same cause, have the Ancients given sundry and divers names, as if the causes had been as diverse. *Varro* therefore giving directions what a man should observe that buyes Bees; mindes him to take notice, if they bee numerous, if they bee shining, and full; whereas if the combs bee not set in an even posture, if the Bees be hairy and thin bodied, they are to be refused, all which are but effects of hunger. Varro de re rustic. l. 3.

In a word, if you desire to have your Bees thrive, and prosper, keep them well from winds and wet, heat and cold, destroy their enemies, and let them enjoy a sufficiency of food gotten by their own industry; and if there be a want in some, timely supply them, and doubt not of, by Gods blessing on your endeavours, the increase and prosperity of your Bees.

CHAP. XXI.

Of the Hony-dew.

THe Hebrew word for Hony-dew is יְרָקוֹן *jerakon*, which comes from יָרַק *jarak*, and signifies *spuere, expuere, humorem evacuare*, as if it were *saliva siderum* (as *Pliny*) an excrementitious moisture, which the stars spit down on the fruits of the earth. By this word also is signified the Kings-evil. Buxtorf. lex.

In Latine *Rubigo* is a Hony-dew, as well as rust, a name from the effect, shewing how that by a hurtful touch, it stops the growth of some fruits that are obnoxious to it, making them to rust, eating out their state and substance, as a canker or rust J. Rowlandson Gods blessing in blasting.

Ribera com. in Amos c. 4.

fretteth iron; so that what is a disease of mettal is figuratively transferred to corn, and such like things; because it destroyes and consumes them, for with too much moisture the stalks wax pale, and the corn is turned to dust; but hee was much mistaken, not distinguishing between smutty and mildewed corn, for corn affected with the mildew is not turned into dust, but shrunk up, and prevented of its radical moisture, so that though it come to maturation (for it will ripen, and is best for seed) yet not to a full bigness and dimension.

Of the cause of smutty corn, I will speak briefly afterwards.

Some conceive shrinking of corn by the Hony-dew to bee thus occasioned. In fields less pervious to clear and strong winds (as in lower grounds, and narrow places between woods and hills) there falls often sultry and foggy mists, and those covering too close the fruits of the ground under them, as under thick mantles do cast that corn or kinde of grain which is subject to this malady, as it were into an unkindly sweat, at such times as the ears thereof are not yet sufficiently filled from the root, by which faint sweat is vented that sweetness that should feed the ear. Now this sweetness once exhausted or drawn out at the stalk, or straw, sticks close unto it being burnt, or made adust by the extraordinary heat of the Sun, as it happeneth especially in the Canicular dayes, which (as it may seem) made the *Romans* sacrifice a Whelp or Puppy to Mildew. And this they did to prevent it, or to drive it away, if it had seized on their corn, That this prejudice is chiefly caused in narrow and close grounds wee grant, and seldome comes on hills, or large champion grounds. But yet it brings not damage to the corn this way, but rather thus, The corn in close places when the Hony-dew descends, not being ventilated and shaken with winds, the Hony-dew as it dries, becomes viscuous and clammy, and sticks close to the straw, and by the heat is hardened and congealed, and thereby stops the radical moistures from ascending, and so the ears being no longer fed shrink and wither. As hard binding or tying of a mans arm, causeth (if continued too long) by stopping the circular motion of the blood, a mortification or gangreen. It comes not from any malignancy as some, nor because that the oily viscuous quality, that is in it

Ovid de fast. l. 4. Hier. Romano de la Repub. gen. l. 2. c. 7.

it ſtops the pores of the huſk wherein the corn lyes, and deprives it from the aire, and conſequently from nouriſhment, this is not the cauſe, but what was delivered before. But hee concludes it is, and therefore commends bearded Wheat, becauſe the beard ſhoots off the dew, that it doth not ſo eaſily inſinuate it ſelf into the ear, and likewiſe cauſeth the ear to ſhake, by the leaſt breath. *Credat Judeus Apella.* Howſoever had hee been acquainted with the inconvenience of bearded Wheat, he would rather have ſtood to the hazzard of a Hony-dew. First large letter in Mr. Hartlibs Legacy.

For cure Mr. *Remnant* preſcribes, when you perceive by your Bees that a Hony-dew is fallen, to draw a cord over your Wheat as faſt as may bee, before it bee dried on by the wind or Sun. One in one furrow, and another in another, two or three furrows diſtant as they can well reach. One at one end, and the other at the other end of the cord, for the leaſt motion will ſhake it off, it is ſo exceeding thin when it new falls. I dare not ſay (as ſome) that this can bee done with good profit, for *materiam ſuperat opus*, the charge will exceed the benefit. Such as ſow ſixty or eighty Acres of Wheat muſt of neceſſity imploy many men, and perhaps many dayes together, for Hony-dews in a dry ſeaſon fall frequently, and ſometimes twice a day, and therefore it muſt be oft reiterated.

And the loſs by it, is ſeldome great, it is rare to have one Acre in an hundred prejudiced by it, and yet we conſiſt of incloſures, and much wood-land.

Pliny affirmed the Hony-dew to bee either the ſweat of the heaven, or the ſlaver or ſpittle of the ſtars, or the moiſture of the aire purging it ſelf. Plin. Nat. hiſt. l. 11. c. 12.

Gualter ſaith, It is cauſed by the inconſtant change of the aire, when immoderate heat cauſe raines, and cold raines expel hear. Gualter in Ames Hom. 11

Dr. *Lake* ſaith, That too much moiſture is the cauſe of it. Dr Lake in 1 King 8. 37.

Mr. *Butler* judgeth the Hony-dew to bee the quinteſſence of all the ſweetneſs of the earth, meaning as hee explains himſelf, the quinteſſence of flowers, becauſe when the year is backward in his fruits, the Hony-dews are alwayes backward, coming only at ſuch times, as the flowers have the moſt ſolid and beſt juice.

Secondly, becauſe in more hot and ſoutherly clymates, where the fruits are more forward, the Hony-dews are more timely; in *Italy* not untill *May* bee entred, but hee ſaith not uſually with us untill a month after, whereas if the ſeaſon bee warm and dry, often by the beginning of *May*, and ſometimes a little before, alwayes in *May*, there are with us many ſwarms.

Thirdly, becauſe the Countries that have ſtore of the beſt and ſweeteſt flowers, have ever the beſt Hony. It is true, that Hony is finer or courſer, according to the flowers that the Bees gather of, but this rather concludes (againſt him) that the Bees gathering is not chiefly, no not very much from the Hony-dews; for it cannot (almoſt) but be ſuppoſed that the exhalation muſt remain ſometimes in the aire, before it bee concocted and fall, in which ſpace either aſcending, or deſcending by the motion of a gentle breath, it will be carried ſome miles from the place where it was firſt exhaled, ſo that grant it extracted from the flowers, yet that which was exhaled from good and fragrant flowers, may fall in woody and heathy places, and that which was exhaled from heathy ground according to the motion of the aire, may fall on good land, his rule then cannot bee conſtant. And ſome years, when there are few or no flowers, yet are there many Hony-dews, as 1652. ſo that the matter of them could not bee extracted chiefly from flowers, and in extraordinary wet years, as himſelf inſtanceth in the year, 1613. the Hony-dews fell not untill the end of *Auguſt*, when moſt flowers had done blowing, and thoſe that were, had a very weak and faint juice, and therefore it is not probable, that there ſhould bee a competent matter for their production chiefly out of flowers.

It is agreed by all, as far as I can ſearch, that the Hony-dew conſiſts of vapours raiſed up into the third region of the aire, exhaled from all lower bodies (not onely flowers) both earth and water, which vapours being purged from the earthier and droſſier matter, and throughly digeſted by the heat of the Sun, and after a ſort made fatter by the cold of the following night, are thickned, and ſo condenſated, fall down on the earth, trees, and flowers.

Ariſt. de hiſt. l. 5. c. 22.

Bees make Hony of the Hony-dew, ſaith *Ariſtotle*.

Butler

Butler ſaith, The greateſt part of the pureſt Hony comes from above.

Seneca ſaith, It is not yet evident whether the moiſture that Bees gather out of flowers be preſently hony, or whether by a mixture or propriety of their own, they change it into hony. Sen 84. Epiſt.

Ariſtotle before the riſing of the *Vergiliæ*, denies that Bees gather any hony, but this is an apparent errour; They gather much hony, when there are Hony-dews, but yet more before any fall, if you reſpect the ſhortneſs of time they gather it in. Bees gather hony more or leſs all Summer, but leaſt in Autumne, becauſe the great dews and frequent ſhowers, corrup tthe native hony which is bred in the flowers; and yet *Ariſtotle* acknowledgeth where there is plenty of Ivy which flowreth in the end of Autumn, the Bees gather much hony, but wee finde it not.

That great plenty of Hony comes from above, is acknowledged, and that the Oak among trees is principally inſtrumental to retain and keep the ſame on his ſmooth and ſolid leaves: yet I affirm, that there is a greater proportion collected from flowers, than from the Oak, and all other ſorts of trees, I underſtand from the leaves.

This indeed is altogether gain-ſaid by *Ariſtotle*: He delivers, that Bees gather not hony of flowers, but chiefly of the Hony-dew; and his argument is, becauſe in a day or two, when the Hony-dews fall, ſome combs will be full, and in the end of Autumn there be flowers, but no hony, if any Hive bee taken, driven, or gelded, hee ſaith they would gather hony, if any were to bee found. Ariſt. de hiſt. l. 5. c. 19.

Wee are to know, That as great ſtore of hony falls from above, ſo there is a native ſweetneſs, or hony, in flowers, the Spring and Summer chiefly, which is not to bee found ſo plentifully towards the end of Autumn, becauſe the flowers at that time of the year are weak and ſpent, and afford little, and that little, is uſually exhaled with immoderate heat, or ſpoyled with frequent raines, or great dews; ſo that there is little, or no advantage at all from them, in reſpect of hony. Some *Sandaracha* indeed the Bees gather then, but that will not laſt long, therefore of neceſſity when Bees are late taken, for want of food, they cannot live long.

If

If Bees gathered hony chiefly of the Oak, which almost alone is retentive of the hony-dew (from flowers he denied they gathered any hony) how comes it to pass that hony-dews falling late in the year, as in the years one thousand six hundred and thirteen, and one thousand six hundred forty eight, almost two months after the usual time, namely, in the latter end of *August*, when there fell divers hony-dews, but the Bees were little the better for them, except only in the Heath Country, when the Heath-flower was in his prime, and there those late hony-dews made their fat stalls, but in other places the Bees generally miscarried.

If they did principally gather of the Oak, the leaves thereof were then as retentive of it, as at Midsummer, but rather hereby it appears, that the hony-dew is received into the hollow sockets of Flowers, and there long contained, until by the Bees it be extracted.

Hony-dews therefore falling late when most Flowers have done blowing, not having any proper place to contain them, are, either quickly washed away with the raine, or exhaled with the Sun.

Further, that Bees gather hony of flowers is manifest, in many Islands where grow no Oakes, nor yet other Trees, nor yet are near them by some miles (as the Island of *Fowlness*) yet Bees thrive very well, and yeeld ordinarily a greater increase of hony than in other places.

Pliny saith, the Bees gather the hony-dew from the Elme, Teile-tree, and Sallow; but our Elmes are not retentive of the hony-dew, nor yet our Sallows often, sometimes a little; more plentifully is the Hop, and would be very beneficial to the Bees, were it not for the bitterness of the leaf corrupting the hony; Chery-trees (especially the wild Cherry-tree) are retentive of the hony dew, and thereupon curle up the leaves, and so contain it longer, but to their owne prejudice, for the radical sap or moysture is thereby checked, and ascends no more, and oftimes their tops wither and dye, but the Oak of all others most plentifully affords it; the great Maple also (vulgarly called the Sycamore tree) the leaves of other Trees are more spongie and porous, and drink it in as fast as it falls.

L. Verul. Silva Silv. cent. 5 496.

The *L. Verulam* makes a doubt whether any cause be from the

the Oaken leaf it self, to concoct; or whether it be only that the leaf is close and smooth (and therefore drinketh not in the dew, but preserveth it)

That which in Scripture is called Manna, by the wisest of the Greeks was called Ἀερομέλι, a hony-dew; and *Celsus* in his Physick saith, by the *Syrian* dew is understood that which by a strange or forrein name is called Manna. Cælius Rhod. Lect. Antiq. l. 21. c. 3. Idem. lib. 25. c. 25

The present Manna, and that wherewith the Children of *Israel* were fed forty years in the Wilderness, differ not much from the hony-dew.

First, That Manna of the *Israelites*, and the manna used by Physitians differ not much, *Fr. Valesius*, and also *Io. Fr. Picus* Earl of *Mirandula* attests the same in certaine learned Verses, and *Lemnius* agrees hereto, saying, the Manna now in use by Physitians is not much unlike the Manna that the *Israelites* fed of. Fr. Vales. de sacra. Philosoph. c. 57. Levin. Leminus Herb. bib. explicat.

The Hony-dew and Manna doe not substantially differ, the Dew is not Hony except it be gathered by the Bees, concocted in their bodies, and condensated (by their heat) in the combes; for when it is thickned of it self, it is called dry manna; but if it be not coagulated it is called liquid manna, as a congealed dew, viscuous, and very pleasant to the taste, of which sort is that which is called Cedria, mentioned by *Hippocrates*, and it is the same which the Hebrews call Manna; it is plentifully gathered of the greater Cedars on *Mount Libanus*, and *Mount Sinai*. Hippocrat. lib. de vulneribus, Pet Bellonius, lib. 2. observat. c 25

The Characters of the present Manna agree to the Jews Manna; Exod. 16. 14

First, it fell on the ground like a hoare Frost, in the night.

Secondly, the taste thereof was like Wafers made with hony, which agrees with the manna now in use.

Thirdly, it was gathered in the morning, before the Sun waxed hot, for the heat thereof did dissolve it, and make it to evaporate and vanish away.

Fourthly, if it were kept, it bred Worms; I was informed from a learned Gentleman, that the Hony-dew hath bred Worms before night, of which he was an eye-witness in our Country.

Some gather the excrements of Bees (of a yellow colour, and

Levin. Lemnius, Herb. lib explicat.

hony taſte) which they finde near the Hives, and ſome ignorantly ſuppoſe to be thickned by an aerial concretion; but this cannot be, for the excrements of Bees are always liquid, and fluid, and if there be any reality in this report, It muſt bee the Bee-bread, whereof much is yellow, and all of a hony taſte; it is gathered in little round parcels as bigge as ſmall pins heads, but they are brittle, and broken, will not eaſily coagulate, for they are not clammy; and the Bees let many fall at the Hive doors, if the entrance be ſmall: but they muſt be very fools that will take this for Manna, much more they that wil be cozened with the excrements.

It hath been queſtioned; whether Manna was knowne to the ancient *Grecians*, ſome deny it, becauſe the name is not found; others affirme it, as *Guido Pannyrolus*, that Manna was known to them, but not under the name of Manna (which word the *Arabs* borrowed from the *Iews*.

Galen lib. 3. de aliment. facult. Amiretus de Aſiæ ponderibus. J. Langius l. 2. Epiſt. Medic 64

Galen ſpeaking of the ſame, acknowledgeth that in his time in *Aſia*, this kind of hony was found ſo plentifully on the leaves of Trees, that the inhabitants ſaid, *Jupiter* rained hony; and long before *Galens* time. *Amiretus* hath exactly deſcribed it under the name of aery hony, as *Jo. Longius* affirms; and the reaſon of this name is evident, becauſe hony like a dew falls from Heaven, or the Air before day-light; for when the exhalations are elevated from the earth, and the waters by the heat of the Sun, and then being perfectly attenuated and concocted, are thickned, and congealed by the cold of the night into hony, graines, or ſand, they ſtick upon herbs and leaves of Trees (ſometimes on ſtones, and the ground) The inhabitants therefore ſpread Hides on the ground, and beat the Trees, and that which falls (like hony) they gather, and put into earthen veſſels, where in a ſhort time it hardens, and becomes as it were like ſand.

Matthiol. comm. in lib. 1. Dioſcorid. c. 73 Meſue lib. 1. de ſimpl. c. 8

It is like a kind of Gum, as *Fuchſius* delivers, and *Matthiolus* confirms the ſame, and *Meſue* alſo ſaith, the *Arabian* hony is a dew falling on Plants (and Stones) whoſe matter is an elevated vapour, which hath its digeſtion and maturation in the air, when it is equal and propitious, with fortunate aſpects. but it is

Galen. lib. 3. de alim. fac.

diverſified according to the diverſity of things on which it falls, falling on plants it participates of the nature of Plants, ſo that the beſt hony is uſually where the moſt temperate Plants grow.

Now

Now if *Galens* description of his Airy hony be compared with this, it accords in every thing; and *Galen* in the same place saith, that this Hony-dew, or Manna, is so like to that hony that the Bees gather of, that they have one and the same matter, namely dew,

Valerius Cordus endeavours by many (but not invincible) Arguments, to prove that they differ; with whom *Hen. Saltmouth*, and *Guido Panyrollus* concur, and accord.

Valerius Cordus Annotat. in Dioscor. lib. 2. c 104. Guido Pannyrollus Nova reperta, l. 2. tit. 6.

First, the Bees hony, saith *Cordus* is found at all times of the Spring, and Summer, but the Hony-dew (and also Manna) but sometimes and seldome.

I answer, that there is a native sweetness in some flowers at most times of the year, and plentifully in a mild and forward Spring, but yet notwithstanding the Bees gather much hony, when the hony-dews fall.

Secondly, the Bees hony is found both night and day in the Flowers, but the hony-dew only in the morning.

I answer, It is true, that the Bees gather hony out of the flowers a great part of the day, but there is (besides the native hony) an addition of hony from the hony-dew in the cells of the flowers, where it is preserved longer than on the Oaken leaves, being there obvious to every drying blast, and exhaling raine.

And so saith the *L. Verulam*, Flowers that have deep sockets, doe gather in the bottome a kind of hony, as Hony-suckles (both the Woodbinds and the Trefoile) Lillies, and the like, and in them certainly the flower beareth part with the dew, and therefore places abounding in Manna, doe also yeeld plenty of hony; Thus *Cephalenea*. Moreover, the hony dew doth not only fall in the morning early, but in hot gloomy seasons, often in the after noon.

L. Verul. Silva silv. cent. 7. 669.

Sands relat. lib. 4

Thirdly, the Bees hony most abounds in flowers about noon, but the hony-dew as soon as the Sun waxeth hot, perisheth; I answer, it perisheth where it is open, and exposed to the Sun and Wind, but where it is well defended from either (as in the small sockets of flowers) it endures much longer.

And I affirme further, that Bees gather most hony in the fore-noon, except the hony-dew falls in the after-noon, and neither raine washeth it away, nor the Suns hot rayes exhale it.

Fourthly, the Bees hony while it is contained in the flowers,

is liquid, but the hony-dew, namely Manna is compacted together, and congealed; Answer, Although the hony be liquid in the combes when it is newly gathered, yet thereupon it follows not that it was so liquid in the flower, being by a transcendent Chimical skill extracted forth of a more grossie substance, and after rarefied, and defecated in the limbeck of their bladder. moreover, as we shewed before, in many parts of *Asia*, the manna falls more liquid, but hardens after it is gathered.

And againe, it is true in some parts of the World there falls, or rather is gathered this concrete, or coagulated hony (the right manna) Manna in *Calabria* is gathered from the leaves of the Mulberry-trees that grow higher in the mountaines, it falls like a dew in the night time, like a dew, and therefore liquid; it is gathered from the leaf of the Mulberry-trees, but not of such as grow in the Vallies, and it falleth upon the leaves by night.

Sands relat. l. 4.

It should seeme that before these dews come upon Trees in the Vallies they dissipate, and cannot hold out; it should seeme also the Mulberry leaf it self hath some coagulating vertue, which conspissateth the dew, for it is not found upon other trees.

L. Verul. Silva sil. cent. 8. 781

And it is more than probable that that Manna that is gathered coagulated, hath its condensation from the vertue of the tree, or plant from whence it is taken.

In *Persia* they call Manna *Xirqueft*, *Xir* in *Persian* is Milk, and *Queft* is the name of the Tree which produceth it, or rather whereof it is gathered; the best comes from *Hiez*, from whence it is carried in great quantity to *Ormuz*, and from thence throughout all the East; it is white, soft, sweet, and in Graines like Incense or Mastick.

Pedro, Teixeira de los Reyes de Persia l. 1. c 7

They have another sort called Toraniabin, gathered on certaine plants like wild thistles; there is a Drug or kind of Manna brought from Utrad, not farre from the River Sind in the *East Indies*; the Naturals call it *Geukar*, of *Kar salt*, and *Geu fat*, for of the dew which falls and congeales in the sowen fields (mark, it falls liquid) it is gathered and called by us Salgeu, and more corruptly Salgema.

Idem lib. 1. c. 22

I must a little digress to reforme a Geographical errour, the River *Sind* which was mentioned before, is the principal of five, of which the River is compounded, first *Behat*, which ariseth near

near *Kabul* towards the coast of *Persia*. The second is called *Chanab*, which comes from the Province *Quexmir* fifteen dayes journey distant from *Labor*. A third is called *Ruwy* springing near *Labor*. A fourth, *Via*; And a fifth *Sind*, which giveth name to the Land and Kingdome, commonly called by the Portugals *Sinde*. And therefore Mr. *Herbert* was deceived, who supposed the River *Indus* to bee called *Sind*. To return again. Mr. Herberts Travels into Africa and Asia, l. 1.

In the vallies of *Chile* in their season fall great dews (which collect and harden) like bread tempered with Sugar or Marchpane (Mark, they fall liquid dews) which is as wholesome as that which they call Manna: By all which instances, it appears that Manna is first a liquid dew, and after inspissated by a vertue of the tree, or plant on which it falls, and falling on other plants or trees, it never cordensates. Ant. de Herrera decad. 7. l. 1. c. 7

From the City of *Balsora* scituate in the end of the Red-sea on the banks of the Rivers *Tigris* and *Euphrates*, is brought a kinde of Manna in bottles like thick hony, so that some Manna, is never coagulated. P. Teixeira relation de los Reyes de Persia, l. 1. c. 7.

Fifthly, Hony-dew is contained in flowers, but the Hony-dew falls on leaves of trees. Answer, only on leaves of trees? Nothing less, on flowers also, and a great part, as I shewed before of the hony in flowers, is not natural but adventitious.

Sixthly, The Bees hony doth not onely last longer, but conserves other things, and that many years; but the Hony-dew, or Manna will not keep uncorrupted one year, nor yet preserve other things from putrefaction; and in the Northern Regions there is plenty of hony, but rarely any Hony-dews.

So *Magirus* Hony-dews are very rare in our Countries, in regard of our cloudy aire, but frequent in the Eastern Countries. Answer, That the lasting of hony longer than Manna may bee from a further concoction which it hath in the Bees bodies, as also from the continued great heat of the Bees after it is reposited in the combs, whereby it comes to further maturation and perfection*. And whereas hee saith, Hony-dews are rare in the Northern Regions, wee often by wofull experience finde the contrary, receiving by the frequency of them, great prejudice in our hops and corn. Jo. Magirus Phisiolog. l. 4. c. 6.

Seventhly, If the Hony-dew bee the matter of hony, how comes

* Vide Cap 52 of the Brasilian Bee called Zelloh.

comes it to pass that it falls onely on flowers, and not on the plants and leaves of trees? Answer, It falls not only on flowers, but on leaves of trees and plants also, though some plants and leaves, are not so tenacious, and retentive of it, as the great Maple, and the Oaken leaf, but being more porous and spungy, suck it up, and consume it.

Lastly, When the Hony-dew falls, the Bees gather it, and flock to it, but onely for their present repast and food. Answer, There is no rustick conversant among Bees, but knows the contrary, and by experience can say, that they then gather more hony in two or three dayes, than in two or three weeks after they cease.

Helmont. tumulus pest.

Ribera, as you may remember, attributes smuttiness of Wheat to the Hony-dew; and *Helmont* seems to be of the same opinion, calling it *Triticum roratum sive mellium*, and so do some others also. Now in a word to undeceive them. The cause of smutty Wheat, is not at all from the Hony-dew, nor yet from any of those causes, that the author of the first letter in Mr. *Harlibs* Legacy delivers. Nor yet is it a deficiency onely in the vegetative faculty, for it grows and produceth a blade, and an ear, but then it wants power to quicken and give life, as it were, by blowing to that corn that is put out in the ear; so that not being enlivened, it proves abortive, and turns into a stinking black powder (*Corruptio optimi pessima*) smelling like a red Herring, or Carrion.

Now this falls out for want of a nitrous, and thereby a nutritive quality in the grain, for it is most certain, that salt is the seat of life, and vegetation, and so the subject of nutrition.

This by the way, take notice of, that they are most under ears that are subject to that malady, not therefore subject to it, because they are lower than others, but therefore lower, because of a deficiency and weakness in the vegetative faculty. And usually if one stalk hath the ear smutty, all that arise from the same root are infected, yet it falls out (though rarely) that sometimes one side of the ear is good corn, and the other bags, for one side blows, and the other doth not, and whatsoever blows not, will be smutty.

Many years together I suffered much damage by it, but knew not how to remedy my self, but after the projection of divers

divers experiments, at last successfully, I fell upon this course, I caused a Hogs-head of salt water to be fetched, and put into the water near a bushel of Bay-salt not at once, nor yet into the Hogs-head, but pouring half of it at a time into a Tub, I after put in half the salt, wherein when it was melted, I imbibed my Seed-wheat thus: Filling a close well-wrought Ozier-basket (that would admit the water, and hold near a bushel) with Wheat, and then put it into the Tub, holding it by the ears, and when it was all well moistened, took it out, letting the water drain as it stood on the Tubs side, into the Tub again. And when it began to leave dropping, poured it on a floor, and strewed upon it as it was turned over, near a shovel full of slaked lime, not that lime addes any thing to the vegetation (perhaps it accelerates the growth) nor yet secures it from vermine (as some conceive) but onely dryes it (being done over-night) that it is more nimble and better to sow the next day. Lime without steeping your corn, doth not prevent smuttiness, but corn thus imbibed, and then sown without lime, will not smut.

Thus adventitious Salt supplies the defect of that nitrous quality which some grain are defective of, and are hereby quickned, refreshed, and as it were impowred to perfect vegetation to maturation.

Such as are remote from the sea, must make a brine which will bee every way equivalent, onely more chargeable, I have many years made trial of this course, and without any great curiosity, for my seed have had constantly bright wheat, and so also my neighbours, to whom I readily divulged what I found good for the publike; but in my publick Discourse, I forget too much my private Design.

CHAP. XXII.

Of Hony.

Cardan affirms, That neither Hony nor Waxe is made by any creature but a Bee, which is a truth, if wee take it de subtil. Cardan lib. 9.

con-

conjunctively, otherwise not. There is no other creature that makes both hony and waxe.

Sealiger de subtil. exercit. 191.

And that which *Scaliger* saith, *Pliny* observes out of *Aristotle* (which I remember not) that Waspes make wax, is false whosoever affirms it. Combs they make, as some other Insects, but they are not wax, but drossie collections of old pales, and other old wood, tempered with a gummy liquor flowing from the Oak, or (felled) Elmes whereby they become tough and capable to contain their young. Try to melt them, and you shall quickly resolve your self.

And whereas *Scaliger* saith, There is in the *Molucca* Hands hony made by Flies less than Ants (the truth is questionable, for it is onely reported by *Pigafetta*) I suppose hee called them Flies, onely for their smalnes. The earth-Bee, with us a kinde of wilde Bee, is smaller, and yet gathers Bee-bread abundantly, and hony also for ought I know.

And most of the *American* Bees are not bigger than Flies, but yet are Bees, not Flies.

And for his instances of the solidity of some hony (admitting of the Histories) they do not at all enervate this position that Bees onely make honey.

Among the *Troglodites* in a Country called *Balgada*, there is hony found whiter than snow, and as hard as a stone; And in the Country about *Calicut* the hony is so hard that they carry it in baskets, what then, was it not made by Bees? I have seen as white, and as hard made by my own Bees. Indeed besides the domestick Bee, the humble Bee makes hony, but little in quantity, and nothing so pleasant in taste for quality.

Math. Ricii de Christiana expedit. apud Sinas l. 1. c. 1.

In *China* there is not onely plenty of Bees wax, but there is another sort which is not onely whiter, but also better, for it is less glutinous, and being lighted, burns brighter: It is made of certain worms which they breed up in trees for this purpose. They make a third sort of a fruit of a certain tree which is not less white than the former, but burnes nothing so brightly.

Thus have wee found hony and wax too, made by other creatures besides the Hony-Bees, but both by no one creature.

Lybanius saith, Hony and Wax may be gathered without the Bees

Bees labour, there is in the flowers, saith he, and leaves of plants, both hony and wax, which by sublimation may be easily segregated, but as a fruitless and needless speculation, I wil not insist upon it. Andreas Libanius, lib. 2. Alchym. tract. 1. c. 45

Gorrheus saith, hony is a sweet juyce, hot and dry, it seemes to have its original from the Hebrew דְּבַשׁ which is delight, and thence the *Germane* Honig, which wee contracting call hony. Mat. Martinii lex Philolog.

By hony Metaphorically is understood every pleasant, dainty, and savoury meat. Dictionar Etymolog. trilingue, I. Fungeris, Cæl. Rhod. lect. antiq. l. 6. c. 2

Hony is the Symbol of Death, as Gallis of Life, wherefore the Ancients offered hony in Sacrifice to the infernal Deities, for because of pleasure, death creeps on us.

Hony signifieth Marriage, saith one, and is taken Figuratively for carnal pleasure, and signifies a worldly life, not abhorring delight, for marriage is honourable; nor is a Christian to be blamed that lawfully useth it. But as in the old Law, although hony might be received for gifts, and first fruits, yet it was forbidden in Sacrifice: so in the Church (only the *Roman* Church) the hony of Marriage is honourable in Lay-men, yet are married persons prohibited the Altar, for it is not lawful for a Priest to be married. Barradas itinerarium filiorum Israel ex Ægypto l. 6. c. 5

There are many sorts or kinds of hony; Aerial, Manna, Reed-hony, Sugar, and that which is gathered by Bees; the best hony is that which is so pure that it glisters yellow (*Aristotle* commends the white) having a good smell, not too hard, nor too thin, sweet to the taste, and hanging together, once being boyled yeelds little scum.

Another saith, that is the best hony which is in a mean between thick and thin, sweet in taste, and yet sharp, pricking the tongue; for colour either pale, or pellucid, and shining like Gold, odoriferous and new, and which taken up, hangs so together that it wil not be easily separated; in a word, the best is at the bottome. Scolia Guil. Plantii in Fernel. method. medendi. lib. 7

A measure that containes fifteen ounces of hony, wil hold but ten ounces of wine, and nine of oyle. Fernel. method medendi, l. 4. c. 6

Diophanes prescribes to know adulterate hony thus; if it will not burne purely, but rather thus; melt a little in a porringer, and Wecker. de secret. lib. 8

and if it be adulterated with flower, or any thing else, you shall perceive it by the scum; if it be pure, it will be as clear as rock water.

Porcacchi descrit del isole di Sicilia.

New hony is better than old, the *Sicilian* was with the Ancients in highest estimation, so that by a Proverb, the *Hyblean* was notorious, *Bauhinus* commends the Attick before all other.

L. Verul. fil. fil. cent. 7. Arist. de hist. lib. 5. c. 22

Some imagine that the chief labour, or rather skill of the Bee is about the Wax, and that the Bee (according to *Aristotle*) gathereth hony only from the hony dew; but this wee made clear before, that she maketh, that is, extracteth more from the flowers, than she gathereth from the trees.

Cardane fondly supposeth, that they neither make, nor gather properly, but convert what they gather into hony, by vertue of a little bagge or bladder sweet as hony; and like saith he, is made of like.

Various are the opinions of the Ancients concerning those that first found out hony, with the nature of Bees; some say by *Euhemerus* in the Island *Cea*; others, by *Euthronius*, in the dayes of *Erichtonius* on Mount *Hymette*, a Country of *Attica*, *Nicander* saith in *Creet*, in the time of *Saturne*.

August Ser. 15 ad frat. in eremo.

Aristodemus the Philosopher studied many years to find out the nature of Bees, and could not; *Aristomachus* saith *Cicero* did nothing else for sixty two years; and *Pliny* saith of him, that he first taught and found out the encreasing of Bees, and was so earnestly affected to them, that he studied day and night how hee might best order, and intreat them according to their kind.

Diod. Siculus lib. 6 Macrob. Saturnal. l. 1. Justin. lib. 13

Others ascribe this invention to one *Thassias*, who deserved great commendation for his skill among Bees, *Diodorus* saith, the *Curetes*, a people of *Creta* first found out hony, *Macrobius* ascribes, *Diodorus*, and *Pliny*, and *Columella*, to *Aristeus* in *Thessalie*, to whom *Justine* agrees, although in his forty fourth Book he ascribes it to *Gargoris*, but only I conceive for *Spaine*; fabulous *Berosus* cites him by the name of *Melicola*, *Polidore* to the *Jews*; I hold it ancienter, for *Jacob* sent a present of hony to the Governour of *Ægypt*.

Polydor, Virgil de invent. rerum. lib. 3. c. 3

Godignus de Abissinorum

In no part of the world is more hony than in *Æthiopia*, the cause whereof is the plenty of Flowers which grow there (let such

such take notice of it that deny Bees gather hony of Flowers, and the many Rivers, Lakes, and Waters. rebus, lib. 1. c. 10

Ilenſagaghen a Town of *Hea* in *Africa* abounds greatly with hony, which ſerveth the inhabitants both for food (conſiſting of two hundred Families, having neither Gardens nor Fruit-trees, but only Barley and Oyl, the inhabitants being ſloathful) and for Merchandiſe to ſell in the neighbour Countries, they caſt away their wax. I. Leo. lib 2

The Mountaines in *Africa* are moſt plentiful of hony, whoſe tops are always covered with Snow, as *Niſiſa*, *Senſana*, *Tagodaſt*; *Thegia*, *Beni-feneſcare*, but white hony is there a rarity; yet in the Kingdome of *Morocho* they have very much hony, ſome for whiteneſs like to Milk, other clear and yellow like gold. I. Leo. lib. 2. & lib. 3, Cælii Auguſt. Curionis, Marochenſis regni deſcript. Moryſon itin. part 3 lib 2. c. 4.

Poland abounds with hony, which they finde in hollow trees, and Caves of the earth, beſides the Husband-mens Hives.

In *Myconi* there are no Bees, and if they be brought thither they dye. Col. Rhod.

Myconi is one of the *Cyclad* Iſlands.

In *Ireland* are many Bees, as well in Hives at home, as in hollow Trees abroad, and Caves of the earth, contrary to *Solinus* and *Iſidore*, and it is as good as in other Countries, and more ſtore would be there, but that there grow ſome Trees that are venemous, but what thoſe Trees be he names not. Ortelii Theſaur I. de la Haye threſor des chartes.

Aldrovand ſaith, there be no Bees in *New Spaine*, and *Iſidore* relates the ſame of *Scotland*, and ſaith, that ſtones and duſt brought thence and laid in the Hives, makes the Bees forſake them, but falſe, as *Polidore* acknowledgeth. Polyd. Virg. lib. 13. hiſt. angl.

Malta is hotter by much, than any other Country which is ſeated in the ſame parallel without Rivers, but hath ſundry fountaines, and hony in abundance. Sand. relat. lib. 4

And the plenty and goodneſs of the flowers in *Malta* is the cauſe that it affords excellent hony, therefore ſaith a learned Phiſitian, that Hony is *Flos florum*, the flower or quinteſſence of flowers, nouriſhing not a little with his ſweetneſs, and preſerving things from putrefaction. Porcacchi deſcrit. del Iſoldi Malta. Marcilius Ficinus, lib. 2. de diet. c 18

Sicilia likewiſe though hot, yet is ſtored with Rivers and Fountaines; the Winter moſt temperate, no day ſo tempeſtuous, as affordeth not ſome Sun-ſhine, and about *Enna* the

flowers are so numerous, and fragrant that the Dogs cannot hunt.

Hier. Girava de Cosmographh.

In *Podolia*, and indeed all *Sarmatia* (understand *Sarmatia* in *Europe*, for there is *Sarmatia* in *Asia*) now it contains *Polonia*, *Russia*, *Prussia*, *Lituania*, *Livonia*, *Podolia*, and *Moschovia*: whereto is added *Alba*, *Rusia*, and *Vandalia*.

Dictionar. Etymol. tri lingue fungeri.

In a word the people were anciently known by the name of *Scythians*. Here is more hony then in all the world besides, for they fill sometimes great dry pits with combs, that the Bears coming to eat the hony, accidentally falling into them, have been suffocated with the abundance.

Clao Mag. hist. delle cose Septen. l. 21.

Nature denies them the vine, but the God of nature hath more than sufficiently recompenced that defect with an incredible quantity of hony, which they use (besides to several other purposes) to make mead with.

Gio. Boterole relationi univers. fali 2 part l. 1.

There is great abundance in *China*, for they wonderfully delight in keeping of Bees, there is also very much wax, you may lade Ships, nay Fleets therewith.

Mendosa, Treatise of the Kingdom of China.

Hony is more plentiful in *Russia* than in any part of the world, thereof they spend great quantity in their ordinary drink (which is Meade of all sorts) and many other uses, and yet good quantity is carried out of the Country, which may better appear if wee take notice that there hath been shipped fifty thousand Pood yearly of wax, every Pood containing forty pound, which amounts to a thousand Tun, and yet the great men use but little Tallow, but much wax for their lights.

G. Fletcher Ruse Commonwealth.

Lettere d' Ab. Campense in te mole cose di Mos. & P. Jovio delle cose del. Mos. apud Rhamusi. 2. Volum.

Muffet perstringeth *Jovius* for applauding the *Russian* hony, for saith hee, There is not a Bee in the whole Country, and hee justifies himself from the relation of *Sebastian Baro*, how truly from the premises you may easily determine.

About the River *Occa*, distant about thirty Leagues from *Mesco*, is the greatest store in all the land of *Rusia*.

Purchas pilg. 3. part. l. 2. c. 1. Incouragement of setling a Plantat. at Madagas. J. Leo l. 8.

There is a report that a greater quantity than that mentioned before is brought yearly to *India*, from the Coast of *Malindia* near adjoyning to *Madagascar*, namely fifteen hundred Tuns.

There is little hony throughout all *Egypt*, and that little is not very good, for it is alwayes moist and thin like water, the reason whereof is said to bee, because the flowers are over moist

moist by the overflowing of *Nilus*, but in *America*, where the lands are not overflown, but exceeding dry, yet the hony is alwayes liquid, so that it comes from some other cause. Alex. Aphrod. s. Prob. 74.

Corsica yeelds many venemous trees, from which if the Bees suck any thing, they make the hony very bitter; It seems these trees were but in some places, for *Athenæus* reports, that the *Corsicans* were long lived with the daily use of hony, which is very plentiful with them; some parts were infamous for their bad hony, occasioned through their plenty of Yew trees, which *Servius* confirms, saying, The *Corsican* hony is bitter, and *Martial* mentions it. Estates of the world transl. by Ed. Grimst. Servius com. in 4 l. Georg. Martial 9. Epi.

Some vainly conceit, all hony at first to bee sharp and bitter, but in process of time being concocted, it returns to its proper sweetnesse. Nicetas com. in Greg. Naz. t. 2. orat. 43.

In the City of *Trapezunt* in *Pontus*, the hony gathered of the Yew trees smells filthily, and makes them that are well in their wits, mad, and but cures those that are distracted. Arist. de Mirabil. Auscult.

In some parts of *Spain* the hony is poyson: Also at *Heraclea* in *Pontus* some years, they have an herb called *Aegolethron*, hurtful to Goats, the flowers whereof, especially in a wet Spring have a poysonous quality. Signs of it, it never thickens, the colour is more red than other hony, a strong kinde of smell, presently it causeth sneezing, they which eat of it throw themselves on the ground seeking to cool themselves, for they are all on a sweat. And if dogs eat their excrements that are affected with it, they have the disease.

Likewise in *Pontus* among the *Sanni*, there is a hony which causeth madness, which is supposed to bee gathered from the *Rhododendron*, whereof the Woods are full. In some parts also of *Persia*, and in *Getulia*, a Province of *Mauritania*. Plin. Nat. hist. l. 21. c. 13

Galen saith, his father had hony so bitter with age, as if it had been gathered in *Pontus*. And therefore *Servius* on those words of *Virgil*, *Dulcia mella premes*, saith, It is not a superfluous Epithite, because there is bitter hony. So is there sharp hony also which comes by age. Gallen, l. 1. de Antidot. c. 2

The hony is bitter near *Phasis*, and about *Heraclea* a City of *Pontus*, from the plenty of Monks-hood, or Wolfes-bane, saith *Dioscordes*. Idem l. 3. de compos. medic. secund Gen. Strabo l. 11. Dioscorid. l. 6. c. 8.

Pet. Bellonius saith, These Countries of *Pontus* abound with

an herb called *Black-cameleon*, the root whereof hath an excrescency called *Ixia*, which is a deadly poyson, and kills presently those that drink it. Now, saith he, if the Bees gather the substance of the hony from the Chameleon-flower, there is no doubt but the hony is very dargerous, but saith hee, wee are not ignorant, that the Bees gather not the matter of their hony from the flowers, but onely of the leaves when they are covered with the Hony-dew. But this great observer, for want of observation failed, trusting too much to *Aristotle*, and others, that the Bees did not make, but onely gather hony.

The *Sanni* of whom wee spake before, paid a tribute of Waxe to the *Romans*, but the hony, as dangerous, was not vendible.

Strabo l.12. *Strabo* writes, that the people called *Heptacometes* beyond *Colchos*, slew three cohorts of *Pompies* souldiers when they passed through the mountain Country, for they mingled a kinde of poysonous hony with their drink, and easily massacred them when they were besides themselves.

Diod. Siculus, l.14. *Diodorus* reports, That the *Grecians* returning from *Babylon* in the Country of *Colchos*, found abundance of Bees, and did liberally feed of the hony, but as soon as they had eaten it, they became mad, and presently threw themselves on the ground, and lay like dead men; but the day after, the same hour they were taken, they recovered their wits again.

Dioscor. l.2. c.75. In *Sardinia* is no venemous creature, yet the hony is poyson. *Dioscorides* saith, It is very bitter, and that they gather it of wormwood, and that it is excellent to cure blemishes and spots of the face. *Galen* mentions it, saying, If any hony bee bitter as the *Sardinian*, it is of a mixt faculty, as if some of our hony were tempered with wormwood. *Virgil* saith, It is gathered of the Yew tree, *Sic tua Cyrneas fugient, examina taxus.* *Diodorus* from the Box tree.

Galen. lib. 7 de simp. facul. Med.

Diod. Sicul. l 6.

Plin. Nat. hist. l.21. c 14. In *Candia* there is a mountain called *Carnia*, nine miles in compass, in which space, no Flies are ever seen, and they never touch hony that is made there, and brought from thence.

In *Thracia* the hony is not only solid, but sandy, such as is gathered in the Heath-country of *Hamshire*, very courle, and red, full of little clots or knots, like sand, but much greater:

Pliny

Pliny dislikes it on good grounds, as the worst hony.

All hony hardened, keeps the same solidity, diverse from water and other liquids, for all other liquid things once compacted, dry, and are attenuated, but hony doth not.

That hony works as wine in the comb untill the twentieth day (asserted by some) is a fable, and that the cover that stops it up is the feces from the working, which they that maintain the former deliver, is as ridiculous; make trial, and you shall finde it wax as the combes.

Some combes in plentiful years, are shut up the first day.

Hony in the comb is all pure, but after it is expressed, some feculent and dreggy matter, partly from the combes, partly from the Bee-bread and spat, somewhat corrupts the purity, all which it purgeth up to the top, contrary to all other liquids where the sediment is at the bottome.

The use of hony was prohibited in the old Law, because it is a symbole of pleasure and delights, in regard of the sweetness thereof. Now pleasures are displeasing to God, no lovers of them can offer a gratefull sacrifice unto him. Therefore the Philosopher said, Because of pleasure, wee doe wicked things. Fr. Valesius de sacro Philoso. c. 16. Arist. Ethic. l. 2. c. 3

Another saith, By prohibiting hony in the Law, wee are to understand Philosophical ostentation, and pleasant allurements of humane eloquence, very sweet in sound, but not in substance. Cælius Rhodl. 28. c. 27. lect. Antiq.

Another, Hony was not offered in sacrifice, nor yet wax, wherein hony is deposited, but oyl for the Lamps in Gods Temple, which was expressed from the bitterness of the Olive, for vices are sweet, and therefore the Harlots lips drop as an Hony-comb. Hieron. Epist. 2. ad Gaudent. t. 1. & Epist. 19. ad Eustochium. t. 1.

Aquinas saith, Hony was not offered in sacrifice, because it was ordinarily offered in sacrifice to Idols, and also to prohibit, and avoid all carnal sweetness and pleasure from those, who intended to offer sacrifices to God. Tho. Aquin. 1 2. q. 102. 3. 14. m.

The heathens used hony in their sacrifices, especially the *Athenians*, and that to several of their Deities, and yet *Plutarch* propounds a question why they did not use it. But it is certain they offered no wine to their gods, but water sweetned with hony. Stuckius Sacr. sacrific. descrip. Plut. quæst 5. Symp: Hier: Romano. l. 2. c. 3.

The

Goodwin Ant. q.l.1.c.12. & Alex. ab Alex. genial dier. l.5.c.26

The *Romans* had divers names for their Religious places, one was called *Scrobiculus*, which was a furrow, or pit, containing an Altar in it, into which they powred the blood of the slain beast, together with hony, and other things when they sacrificed to an infernal Deity.

Hier. Romano l.2.c.8

The *Romans* sacrificed to *Pluto* three times in the year, the beasts for sactifice were black, old, and barren, and they made ready in this sacrifice a drink of wine and milk, mixed with hony and blood.

Gail. Moses unvailed

One gives this as a natural reason, because being burnt, it had no good smell.

Idem. l.2.c.9

In the Feast of *Bacchus*, all the Priests being crowned with garlands of Ivy, offered sacrifices made of fine flower, and hony fried with oyl, and sometimes with hony, because *Bacchus*, as they supposed first found them out. *Horace* saith,

Horat. in carm.

They sacrificed hony taken out of the Combs to him.

Ovid. l.3. Fast.

Bacchus by some was called *Bryseus*, from an old word, βρύω to flow, because he first taught the use of hony: And *Ovid* saith, That hee was not onely the inventor of hony, but that hony was offered in sacrifice to him.

Plutarch de Iside. & Osir.

The *Egyptians* when they celebrated the feast of *Mercury*, did eat hony and figs.

Hier. Romano l.2.c.11

Among many other things which the *Romans* offered in sacrifice to *Ceres*, they used to present hony and wine. And because *Ceres* sought her daughter *Proserpina* ravished by *Pluto* with torches, or candles, which shee lighted in the *Vulcanean* mount *Etna*, therefore a day of burning lamps and candles, was dedicated to her by the heathen, and from hence came the feast of Candlemas among the Christians.

Goodwin Ant. l.2.c.13. Alex. ab Alex. genial dier. l.6. c.8.

In the sacrifices to *Bona dea*, or the earth, they used wine, but called it not by the name of Wine, but Milk or Hony, and the vessel wherein it was put, the Hony-vessel.

Eurip.

The ancient *Greeks* quieted or appeased their dead with hony, *Iphigenia* in *Euripedes* vowing sacrifices to her brother, promiseth to sprinkle the blood of a Mountain-calf, the liquor of *Bacchus*, and the labours of yellow Bees.

Chaucer in the Knight's tale.

Chaucer relating the burning of Arsite, tells what they used to cast into the Funeral flames.

With

With veſſels in her hand of gold full fine,
All full of Hony, Milk, Blood, and Wine.

They gave the deceaſed a Wafer tempered with hony to appeaſe *Cerberus* withall. Adr. Turneb. l. 28. c. 45.

In *Peloponeſus* they began their ſacrifices to the goddeſs *Meliſſa* which was adored among them, becauſe ſhee taught them the uſe of hony. Hier. Romano lib. 2. cap. 1.

This *Goropius* denies, for hee ſaith, *Noah* firſt after the deluge ſacrificed to God, and God ſmelled a ſweet ſavour. This was the firſt banquet after the flood, wherewith *Noah* feaſted *Jupiter*, for which, becauſe it was ſweet, hee was called *Meliſſus*, namely for offering hony to *Jupiter*, and becauſe this Hony-ſervice or ſacrifice came from him willingly, hee was ſaid to have a daughter at home called *Meliſſa*, namely the hony goodneſs of his minde, whereby hee made a feaſt to God. Gorop. Becan. Hierogliph. l. 13.

And then becauſe with this ſweetneſs, or *Meliſſa*, hee preſently obtained that favour from God, by which hee was abundantly ſupplied with all neceſſaries; for this, hee was ſaid to have another daughter, which was called *Amalthea*. So that having *Meliſſa* 'good will, and *Amalthea* a large plenty of all things; and by theſe his two daughters daily to feaſt *Jupiter*, poſterity fained that *Jupiter* being an Infant was nouriſhed by the daughters of *Meliſſus*.

In ancient times, Junkets prepared with hony, were proper to marriage ſolemnities, of which cates, or honied cakes, the Bridegroome firſt taſted, and then the Bride, and after the Gueſts. Pineda de rebus Solom. l. 3. c. 12

Curtius ſpeaks of it in *Alexanders* marriage with *Roxane*. And *Pineda* ſaith the ſame of *Solomons* marriage with *Pharaohs* daughter to bee obſcurely implied, *I have eaten my hony-combe with my hony, I have drunk my wine with my milke; Eat O friends, drinke, yea, drinke abundantly, O beloved.* Which is an invitation of the Spouſe to the taſting of it: Where the Septuagint Reads, *I have eaten my bread with my hony.* Moreover it ſignifies any extraordinary ſweetneſs, as alſo milk, or any more pleaſant dainty. And truly hony and wine ſeem to bee proper to Nuptial feaſts, which is more clear, *Ezek.* 16. 13. For where- Q. Curtius l. 8. Cant. 5. 1.

as all the reſt that went before concerned marriage; this was a wedding Ceremony to eat bread made of fine Flowre, Hony, and Oyl by the communion whereof the Bride was taken into the Partnerſhip of the King bed and Kingdome.

Jo. Leo l. 3. In Fez after the Eſpouſals and Marriage ceremonies performed, diverſe Gueſts are invited to a Banquet, where for great dainties is firſt brought a kinde of bread fried and tempered with hony.

J. Miletius Religio. Boruſſorum. Among many other Nuptial ceremonies which the *Boruſſians* uſe, after they have waſhed the Brides feet, and with that water ſprinkled the Marriage-bed, and all the utenſils of the houſe, and the Gueſts alſo, then they anoint her mouth with hony, and covering her eyes with a vail, lead her to all the doors of the houſe, which they bid her ſtrike with the right foot.

Religio Ruſſorum ad Dom. Chytreum. The *Ruſſians* uſe many ſtrange Marriage-ſolemnities. The Prieſt having a book open before him, ſings with a loud voyce one of *Davids* Pſalmes. And then taking hold with his hand on one of the Bridegrooms curled locks, ſpeaks to him after this ſort. Tell mee, O Bridegroom, brother, friend, Wilt thou bee this young womans husband, Wilt thou ſometimes beat and cudgel her, &c.

Here the Bridegroom ſolemnly proteſts to do the office of a good man. And then turning his ſpeech to the Bride, he asketh her, if ſhee be ſufficient for a husband (for their Maids often, and eleven years old marry) Will ſhee have a care of the houſhold affairs &c. which ſhee affirms. Then the Prieſt puts on either of their heads a Garland made of Boughs, in the circumference whereof is written in *Ruſſe* letters, *Increaſe and multiply*. While he doth this, many wax candles are lighted, and a bowl full of Mead is then given to the Prieſt which hee drinks all off to the new coupled at one draught, and they cheerfully pledge him and then return him the cup again.

G. Fletcher Ruſſe Commonwealth c. 22. After many preceeding ceremonies, the Bridegroom taking the Bride by the hand they go together with their friends after them towards the Church-porch, where hee is met by ſome with pots and cups in their hands full of Mead (the *Ruſſ* proper wine) where if the Bridegroom taketh firſt a Clark or little cup full in his hand and drinketh to the Bride, who opening her hood or vail below, putteth the cup to her mouth underneath

neath it (for being seen of the Bridegroom) pledgeth him again.

The *Romans* in the Nuptial supper, gave the new married couple the juyce of Poppy tempered with milk and hony. Ovid. l 4. Fastum. Ad. Turnes. adverl. l. 28. c 45

The Ancients did use hony in all their Sweet-meats, as wee do Sugar, indeed they knew not what Sugar was.

The *Romans* used hony in their first service at their feasts, as also in their second. And indeed formerly no kindes of mear, but were with the use of hony made more acceptable. Fulvius Ursinus.

Pithagoras usually fed on hony, and Hony-combes, because they were prepared without mans labour, and were a kinde of heavenly food. Lilii Greg. Syrald. Symb. t 2.

To this day the *Jews* give Infants a taste of butter and hony before they suck. Calvin in Esaiam c. 9.

Among the *Illirians* was first of all the use of Mead, which in *Aristotles* time the *Greeks* were scarce acquainted with. Aristot. de Mirabilibus auscultat.

CHAP. XXIII.

Of Tree-hony.

THere was anciently, and is still Tree-hony, as well as Bee-hony. And this Tree-hony is of two sorts, either a plentifull hony-dew, which might bee gathered; or else sweet saps or juices drawn out, or concocted from several sorts of trees and fruits, to the consistence, taste, and likeness of hony.

Of the first sort it is reported that near the *Caspian* sea, there are plenty of trees with leaves like Oaks, yeelding much hony, but it must bee gathered before the rising of the Sun, for the rayes thereof quickly consume, and waste it. Mr Anton. Coccii Sabellici Enn 4. l. 5.

In *Arabia Nabathea*, they gather hony plentifully of the Trees, which they call Wild hony, of which, mixt with water, they use to drink. Diodo. Sic. Bibliothl. 19.

There is a Tree called *Occhus* in the vallies of *Hircania* that distilleth hony in the mornings. L. Verul. cent. 7. c. 612.

In *Lidia* there is plenty of hony gathered of the Trees of which the inhabitants make loaves, or lumps of such hard- Arist. de Mirabil. auscul.

neſs, that without many blows, they cannot bee broken.

Mouffet Theatrum Inſect. l. 1. c. 5.

The inhabitants of Mount *Libanus* ſpread hides under the trees, and then ſhake and beat them, and after gather up the hony, which they reſerve in earthen pots.

J. Acoſta natural and moral hiſt. of the Indies l. 4. c. 23.

The *Maguey* is a Tree of wonders, it yeelds Hony, Water, Wine, Oyl, Vinegar, Syrrup, Thred, Needles, and a thouſand other things. It is a tree which the Indians eſteem much in new *Spain*, and have commonly in their dwellings ſome one of them for the maintenance of life: It grows in the fields, and hath great and large leaves, at the ends whereof is a ſtrong and ſharp point which ſerves to faſten little pins, or to ſow as a needle. And they draw out of this leaf as it were a kinde of thred which they uſe. This liquor being ſodden, turns like Wine, which grows to Vinegar, ſuffering it to ſowre, and boyling it more, it becomes as hony, and boyling it half, it ſerves as Syrrup.

Hackluits Voyages firſt part Iob. Hort.

Hen. Hawks ibid.

Below by the root of the *Magueis* Tree, the *Indians* make a hole, whereat they take out twice a day a certain kinde of liquor which they ſeethe in a great kettle, untill the third part bee conſumed, and then it waxeth thick, it is as ſweet as any hony. It is not ſo ſweet as the hony (ſaith another) of Bees, but it is better to be eaten with bread.

Fernand. Corteſela. 2. relation apud Ramuſ. 3. volum. Herrera decad. 8. l. 5. c. 1.

In and about the City of *Themiſtitan*, beſides the hony of Bees, is hony of the Canes of *Maiz*, which Canes yeeld very much hony, and as ſweet as the juyce of the Sugar-cane.

In *Santa Cruſe*, and the Country about it, which is in the Province of *Tucuman* grow ſweet Canes, of which they make very good hony.

The fruit of the Palm-trees growing about *Jericho*, being trodden and preſſed out, yeeld great quantity of hony.

Geor. Cedrens hiſt. compend. Bedade hiſt. hoc. l. 3. c. 14.

There grow trees in *Paleſtina* with broad and round leaves of a milky-colour, and a hony taſte, very brittle by nature, which they eat, rubbing them in their hands. This a certain Biſhop, called *Archelpous*, who had viſited the Holy-land, ſuppoſeth to be the wild-hony that *John Baptiſt* lived of in the wilderneſs.

Baron. Annal. Eccleſ. t. 10.

Iſidor Peluſiot 132. l. 1. Theophil. in Evang. Mat. c. 3.

But others ſay, it was a mountain-hony made by wilde Bees, bitter, and unpleaſant to the pallat. *Theophilact* wilde hony was made by wilde Bees in trees and rocks.

They get the Palm-wine after this ſort in *Congo*, they bore a hole

hole near the top of the tree, whence flows a liquor which they receive into pots faſtened underneath, at firſt it is in taſte and colour like milk, it quickly ſoureth. Iarric. Theſaur. indicus.

In *Cranganor* they make hony of it after this manner, within three dayes (for after of its own nature, it proves vinegar) they boyl it in Caldrons, or Kettles untill two parts bee waſted, and then it is very ſweet hony. Of this hony mixed with water, and purged twenty dayes together, they make an excellent ſweet wine. I might ſpeak of the *Indian* Palm, or Coco-tree, which likewiſe yeelds hony, but I will adde no more. Novus orbis Ioſephus Indicus.

CHAP. XXIV.

Of Wax.

WAx is either natural or artificial, the natural Wax is the groſs part of the combs, containing the hony and Bee-bread, ſometimes the Seminaries for generation. And this is either Virgin-wax, or of a courſer ſort: the Virgin-wax is that which is made by a ſwarm, or a ſtock new driven, not that only which is made by the younger Bees, as *Hellerius*, for they work altogether. Hellerius l. 6. Inſtitut Chyrurg. c. 1.

This is called by ſome *Propolis*, as *Aldrovand.* obſerves out of *Actuarius*. And *Scribonius Largus*, It might bee expected, that I ſhould ſpeak ſomewhat of *Propolis*, *Commoſis*, *Mity*, and *Piſſocera*, uſed anciently in Phyſick, and ſuppoſed to bee made by the Bees. But I can finde no agreement among Philoſophers, nor yet Phyſitians what they are, and am certain that they are not what *Ariſtotle*, *Pliny*, and others determine them to be, and therefore I will leave the diſcuſſion to others. Only in a word, *Mity* ſaith *Ariſtotle*, is the black droſs of wax of a ſharp ſmell, I ſuppoſe he means the feces of the wax when it is melted and ſtrained; *Propolis* ſeems, ſaith *Scaliger* a tranſlative ſirname of *Mity*. Actuar. de compoſ. med. Ariſt. de hiſt. anim l. 9. c. 64. Scalig. com. in loc.

Cato tranſlates it *Commoſis*, but *Pliny*, make a difference between *Commoſis*, and *Propolis*, wherefore *Scaliger* was of opinion, that *Commoſis* and *Mity* were different things. Plin. lib 11. c. 7

Scribonius takes Virgin-wax (as before) for *Propolis*; *Silva-*

cus takes it for the dreggs of the combes, but amiss, saith *Mouffet*, and yet he would have it to be Hive drosse, but whether of a Swarme or a Stock he declares not; between which is a great difference; *Andreas Bellunensis*, the filth or drosse of the sides of the Hive; I subscribe to *Sylvaticus*; Propolis is as much as subutbe drosse, with which the Bees fasten the skirts of the Hive to the board; it is not saith *Mouffet* now to be found.

Waxe is thus made by the Bees; they creeping upon the Flowers with their fangs and tongue, as *Aristotle* and others say, extract a gummy and viscuous matter, which they receive with their fore-feet, and rubbing them on the thighes of their hind-feet, there fasten it, very little at a time, and scarcely visible.

Mouffet saith, the burden is of the bigness of a lentil on either thigh, and that it is of divers colours, according to the nature of the Flowers, yellow, pale, red, Saffron colour, white, black, &c. but hee and many others were mistaken, taking Bee-bread for Waxe.

Dioscor. l. 2. c. 7. Plin. lib. 21. c. 14

The best Waxe is somewhat yellow, fat, pure, odoriferous, and expressing in some sort a scent of honie; *Dioscorides* commends the Pontick or Cretan, *Pliny* commends the Punick, and it is called Punick, saith *Iacobus Dalechampius*, because it is the whitest.

Johannes Anglicus in rosa anglica, lib. 1. c. 1

Artificial Wax is that whereto the perfection of it the skill and industry of man is required, and this is variously performed; two waies are set down by *Anglicus*, First, that the Waxe should be often melted, every time taking new water until it be white. Another way is thus, that when it is dissolved in the water by the fire, to dip into it a Glass vial, or vessel clean rinsed, and that which sticks to it let it be dried in the Sun, and Moon; and this so long continued until you have gathered up all the Waxe, and then set it abroad in the open air, for it grows white by the force of the Sun (that I say nothing of water) because so the hony is taken out of it, and those parts expire by whose thinness the colour is made.

Waxe as it is newer, so it is better, for it is more odoriferous, puerer, and apt to take impressions, Waxe is worst at the bottom, best at the top, so that it be not frothy.

Mr. Remnant.

The Bees gather Waxe all the year, from the blowing of the Willow to the Ivie.

In

In old Waxe saith *Aristotle*, there is bred small white Creatures, the least of creatures, called Acari, in regard of the smallness, not devisible, I suppose he means Mites, which are bred also in many other things.

The Kingdome of *Chandecan*, watered with the river *Ganges*, is plentifully stored with Waxe, which in abundance the people finde in the Woods, and therewith supply *Bengala*, and a great part of *India*. Franciſ. Fernandus

The *Livonians* knew not the use of Waxe, and therefore pressing out the hony threw it away; *Cadamustus* reports the like ignorance of the *Africans* in *Mauritania*. Aloysius Cadamustus.

From the Coast of *Malindia*, near adjoyning to *Madagascar*, there is brought one thousand five hundred Tun of Waxe yearly to *India*.

Teculeth a Town of *Hea* sendeth Waxe into *Portingale*; and to *Temsethne* resort ships from *Portingale* for Waxe. Io. Leo, lib. 2

In *Fez* on *Mahomets* Birth-day the Schollars of every School, which are two hundred, celebrate a Feast, when the Fathers are bound to send each man a Torch unto the School, whereupon every Boy carrieth a Torch in his hand, some of which weigh thirty pound; these Torches are most curiously made, being adorned round about with divers fruites, of Waxe, which being lighted betimes in the morning doe burne till Sun rising, when the solemnity ceaseth. This day useth to be very gainful unto the School-masters, for they sell the remnant of the Waxe upon the Torches for above a hundred Duckets. Idem, lib. 3

The *Persians* in old time, and also the *Africans* had a custome to wrap up in Waxe their dead, that so they might preserve them for a long time. Funerali antichi da Tho. Porcacchi, tab. 22.

The *Romans* in the Burial of a Senator or chief Officer, had certaine waxen Images of all his Predecessors carried before him on long Speares. Goodwin, Rom. antiquit. lib. 2. c. 7.

Wax was much used anciently, to make the Images of eminent persons deceased, as also in our daies, which by many circumstances (as appears) were borrowed of the *Romans*; who when the deceased Emperour was to be consecrated, the whole City gave over all exercises, as if it had been a Festival day; First, they burned the dead Body with sumptuous exequies, and then they made an Image of Waxe as like as was possible to the deceased

deceaſed, and ſet it in the porch of the Pallace upon a great bed of Ivory, placed aloft, and covered all over with cloth of gold; this Image lay pale on the Bed as if it had been a Sick Perſon, about the bed ſate a great part of the day all the Senators cloathed in black, and on the left ſide the Ladies, that in regard of their Husbands, or Fathers, were moſt illuſtrious, and none of them did wear any gold, or any other ornament about their necks, but were all cloathed in pure white garments, and by their countenance ſeemed very ſorrowful, and they continued thus in this guiſe ſeven dayes; but every day the Phiſitians came to the body, and made ſhew of feeling the ſick Parties pulſe, and alwaies reported that he grew worſe and worſe, until in the end they ſaid he was dead.

As ſoon as they had declared him dead, the moſt noble and proper young men of the Order of the Senators and Cavaleers lifted the bed on their ſhoulders, and carried it by the Sacred way into the ancient Market, where the *Romane* Magiſtrates were accuſtomed to lay by, and renounce their command and authority.

In this place was erected a Tribunal of Wood, which ſeemed to be of ſtone, on which was framed a certaine edifice, ſuſtained on every ſide with Pillars, and variouſly garniſhed with Ivory and Gold, on which was laid another Bed with ornaments of Purple and Gold woven together, and about it, were the heads of divers Sea and Land creatures; now in this Bed they placed this Image of Waxe triumphantly adorned, which they had brought from the Pallace, and there ſtood a very fair youth with a fan of Peacocks Feathers to ſcare away the Flies, as if the Emperour ſlept.

In the meane time while the Image lay there, the living Emperour, the Senate, and their Wives drew near to the Bed, until they were all met together, there the Ladies ſate under the Porch, but the Senators open; on both ſides of the Market were ſet up Scaffolds to aſcend on, which on one ſide were a Quire of noble youths, all patricians, and on the ſide a Quire of illuſtrious Women, which ſung Hymns and other Songs in honour of the dead, with ſad and mournful voyces. But I muſt play the Procruſtes with this Diſcourſe, and referre them that deſire to know further, to *Dion*, or *Herodian* Greek Hiſtorians.

CHAP.

CHAP. XXV.

Observations and Discourses Historical, and Fabulous.

BEfore the battel of *Pharsalon* Bees lighted on the Altar, and also on the ships, presaging *Pompies* overthrow; and therefore when in the Army of *Brutus*, there setled a swarm of Bees, the South-sayers bad him to shift his Camp, lest hee should receive loss and damage in that place. Rosinus Roman. Antiq. l. 3. c. 9. Dion Rom. hist. l. 41. Appian l. 2.

All the Statues of *Antoninus Pius* in *Hetruria* were filled with swarms of Bees, which were ominous presages of his Empire. Iulius Capitolinus.

It was ever esteemed as an ill omen for swarms of Bees to light in places where they were not accustomed, and therefore reported as a presage of the death of *Claudius*, that a swarm of Bees setled on the Capitol. Cornel. Tacitus l. 12.

One speaking of the prodigies that did precede the battel of *Canna*, saith, that swarms of Bees lighted on their Ensignes. Silius Italicus.

Nec densæ trepidis apum se involvere nubes
Cessarunt Aquilis.

Among the many Prodigies ominating *Brutus's* destruction, swarms of Bees lighted in his Camp. Swarms of Bees setled in the Camp of *Dinsus* when hee fought prosperously at *Arbala*. Appian de bello civili l. 4. Plin.

Ambrose sleeping in his swadling cloaths having his mouth open, a swarm of Bees came and setled on his mouth, which the father and mother walking by, forbad the Maid that tended him to brush off, where a while continuing, at last they flew up into the air, untill they could bee seen no more. Baronius Annal. Eccles. t. 10. Cicero divina. 2. Val. Max. l. 1. c. 6.

Plato sleeping in his swadling cloaths, the Bees brought hony to his lips, foretelling the singular sweetness of his eloquence. I. Sarisber. de nugis curial l. 1. c. 13.

Hiero sometimes chief Magistrate of *Sicilia* the son of *Hieroclitus*, a Noble-man, who drew his original from *Celus*, an ancient Tyrant of *Sicily*, but his mothers stock was mean Iustin l. 23. I. Sarisberiensis de nugis curial. l. 1. c. 13.

and contemptible, for hee was born of a Maid-servant, and therefore as a disparagement to his fathers race, was cast forth, whom the Bees (wanting all humane help) fed with hony, which being known, the father by the *Augurs* counsell received again, and brought up as the Heir of the Kingdome.

Ælian l. 2 c. 53

Ælian citing *Antenor*, reports that the inhabitants of a certain City in *Creta* were forced to forsake their dwellings by certain Bees called *Cholichoides*, which did miserably molest, and sting them.

Willer. Tyr. archiepis. Hist. lib. 19. & Raimund. de Agiles Hist. Francorum

The Citizens of *Marra*, two dayes journey from *Antioch*, being besieged by *Goufrey* Duke of *Bullen*, amongst other things which they threw over the walls to drive away their enemies, cast over Hives full of Bees.

Appian. de bello Mithrydat.

Lucullus Army besieging *Themiscyra* scituate on the banks of the River *Thermodon*, and by Mines seeking to overthrow the walls, the inhabitants opened them above, and threw in Hives of Bees among them to their great trouble and vexation.

Bonfin. l. 4. dec. 3.

When *Amurath* the Great *Turk* besieged *Alba Greca*, the Inhabitants, besides other things cast Hives of Bees among the *Turks*, whereby they were greatly annoyed.

Vitichindus l. 1 gest. Sax.

A Captain of the Emperours being besieged by *Giselbert* the King of *Lorrain*, restrained the enemies when they entred the place, by casting hives of Bees; for the horses being enraged with their stings, overthrew their Riders, or were altogether unserviceable.

Oforius de rebus Eman. l. 8.

Lupus Barriga warring with the *Moors* in *Mauritania*, and besieging a Town called *Tornis*, the Inhabitants being at the last cast, threw over the walls abundance of hives of Bees, set on fire, wherewith the *Portingals* were so burnt, and stung, that they were forced to give over, with the wounding of their General, and many others.

Suidas.

Cozenours and Cheaters were thus anciently punished, they divested the guilty person of his cloaths, and then anointed him with hony all over his body, and set him in the Sun with his hands and feet fast bound, that by many reiterated stings, and the Suns heat, they might receive a death, worthy of their life.

Georgius Brawn l. 4. urbium præcipuar.

In *Sivil* a City of *Spain*, if a woman beats her husband, shee is carried on an Ass through the City naked from the girdle-sted upwards

upwards, and being first anointed with hony, besides other despights, and injuries, suffers not a little misery from the Bees, Waspes, and Flies that molest and sting her.

Marcus an old man in the reign of *Constantine*, overthrew an Idol Temple at *Arethusa*, and was taken under *Julian* the Apostate, and first scourged on his naked body, and after other punishments, in the last place put in a basket, being all over anointed with hony, and so set abroad, whom the Bees (thinking hee had robbed them) stung therefore to death. Theotdore. l.3.c7.

Hermonax the son of *Amynter*, and *Lysodice* being a childe, and coming to the Hives to rob the Bees, was killed with their stings.

Onesilus the brother of *Gorgus* King of *Salamis* in the Isle of *Cyprus*, fighting against *Artybius* a Persian General, was slain, and his head cut off, and hanged over the gates of *Amathusium*, a City in the same Island, which hee had sometimes before besieged; into which when it was empty, a swarm of Bees entred, and filled it with combs, this is reported as a Prodigy (and doth not prejudice the cleanlines of Bees) for consulting the Oracle, they advised to take down the head and bury it. Herodot. Halicar. Terpsichore. l.5.

Livonia is repleniſhed with stately Woods, and those furnished with industrious Bees, which sometimes being numerous, are put to hard shifts for habitations. Mr. *Barkley* an English Merchant, did in one of these Woods eat hony out of a mans skull, wherein a swarm of Bees were, and bred as it hanged. Purchas Pilgrims 3.part. l.3.c 20.

It is reported that in the Sepulchre of *Hippocrates*, the Prince of Physitians, for a long time a swarm of Bees lived, and wrought hony in it, and that this happened extraordinarily, is concluded, because that Nurses anointing childrens mouths near the grave, with the hony easily cured them.

Dionisius the son of *Hermocrates* swimming over a River upon his horse, his horse was mired, and could not bee pulled out by any means, hee leaped off his back, and got safely to the bank, and so forsook the horse as no longer his: But the horse followed after, and neighed, whereupon he returned, and when he laid hold on his Main to mount up, a swarm of Bees encompassed his hand, which hung on his Mane a presage of his future command and Empire. Ælian. var. hist. l.12.c.40.

Pauſanias in Beoticis.

The *Trophonion* Oracle was thus found out: When as a year or two together, there was no rain, ſome were ſent from every City to *Delphos* to implore help. To whom deſiring a remedy for the drought, *Apollo* commanded them to go to *Labadea*, and ſeek a remedy for their evill of *Trophonius*. Going therefore to *Labadea*, but not able to finde the Oracle. *Saon* one of the Ambaſſadors an old man, when he had eſpied a ſwarm of Bees, reſolved to follow them whitherſoever they went. When therefore hee ſaw them flying to a Cave, hee entred in, and underſtood that place was the Oracle which they ſought for.

Theocritus Idyll. 7.

Comates feeding the flock of his rich Maſter in *Sicily*, was ſometimes accuſtomed to offer ſomewhat of his flock to the Muſes; which when his Maſter knew, hee reproved him very ſharply, whom *Comates* intreats not to bee angry, for by the Muſes help there ſhould be a large remuneration. Go to, ſaith his Maſter, let us make trial whether the Muſes will feed thee, and incloſed him in a hollow tree, and there left him to periſh with famine. And at the years end returning, found his ſervant alive, and well, and many Hony-combs about him, for the Bees by a hole had entred into the tree, and maintained him.

Æſop. Fab. 85.

The Bee-maſter being abſent, one came and ſtole the combes out of the Hive, who afterwards returning found his Bees plundered, and while he ſtood ſtill a while to examine and conſider concerning the author of it: The Bees came home from work and finding their houſe robbed, and him ſtanding by, did fal upon him, and cruelly ſting him. To whom hee thus ſpake, *On you wicked creatures, you let go unhurt him that robbed you, and puniſh mee that am careful of your ſafety.*

Natal. Com. Mythyolog. l. 5. c. 11.

Meliſſa one of the Oread Nymphs finding Hony-combes in *Peloponeſus*, invited her fellows to taſte thereof, with the ſweetneſs whereof they were ſo raviſhed that the *Grecians* called the Bees by the name of that Nymph.

Sands relat. l. 4.

Jacobus Sanazarius that excellent Poet, hath his figure cut to the life in *Mergellina* (near *Naples* where he lived) from whoſe mouth the Bees do ſeem as it were to ſuck hony.

Terripius.

Livy doth relate that there was found two Coffins of lead in a tomb, whereof one contained the body of King *Numa*; being ſome four hundred years after his death; and the other his books

books of sacred Rites and Ceremonies. And that in the Coffin that had the body, there was nothing at all to bee seen, but a little light cinders about the sides, but in the Coffin that had the books, they were found as fresh as if they had been but newly written, covered over with watch candles of wax, three or fourfold.

Agesipolis a King of the *Lacedemonians* dying of a Feaver near the City of *Clynthia* was preserved in hony, and so carried to *Sparta*, where hee had a royal Funeral. Xenophon de rebus gestis Grecorum, l. 5.

Claudius Cæsar had a *Hippocentaure*, a Monster, part horse, part bull, brought out of *Egypt* in hony, which *Pliny* saith he saw. Cæl. Rhod. lect. ant. l. 6. c. 2

Alfrith the widow of King *Edgar*, sometimes Monarch of this Island, traiterously slue King *Edward* his son, that her son *Ethelred* his brother law might (as hee did) succeed him. Some ten years of age was hee when his brother *Edward* was slain, and hee out of childish affection wept for him bitterly; which his mother extreamly disliking, being author of the murther, onely for his sake, most cruelly beat him her self, with a handfull of Wax-candles. So that hee would never endure Wax-candles. But another Writer saith that *Ethelred* would never endure any Wax-candles, because hee had seen his mother unmercifully with them, whip his brother in Law, King *Edward*, either report may bee true. Rob. Glocestrensis. Vit. S. Ed. apud Ranulph. Cestren. l. 6.

Now the Sword and Scepter is taken from the *Jews*, instead of other penalties they inflict sharp penances according to the nature of the crime. Thus the Adulterer satisfieth for his hot lust in cold water, wherein hee is enjoyned to sit some Winter dayes; and if the water bee frozen, the Ice is cut out, and hee set therein up to his chin, as long as an egge is roasting. In Summer time hee is set naked in an ant-hill his nose, and ears stopped, and after washeth himself in cold water. If the penance seem lighter, they enjoyn him further to run through a swarm of Bees, and when the swelling of his body through their stinging is abated, he must do it again, and again, according to the measure of his offence. If hee hath often that way offended, hee is bound to indure that penance many years. Purchas Pilgrimage l. 2. c. 9. ex Buxtorf.

Hunding the 23. King of *Sweadland*, upon a false report of his brother in Law *Hadings death*, King of *Denmark*, invited all his Nobility to a sumptuous feast, to conclude which, hee Krantzius.

had provided a very large vessel of Mead, of which hee drew out himself to them untill they were all drunk, and then in token of love to his supposed dead friend, plunged himself into the vessel, and so was willingly drowned (but ridiculously and foolishly) some applaud and prefer him therefore, before many heroical *Greeks* and *Romans*.

I. Magnus hist. Sueonum.

Plin. Nat. hist. l. 21. c. 13.

Hostilia is a Town in *Italy*, watered by the River *Po*, the inhabitants whereof (when meat for Bees grows scarce about them) carry their Hives into Boats, and by night convey them up five miles against the stream. In the morning the Bees go forth to their work, and so do they shift places, ascending up the River, till by the sinking of the Boat, they know their Hives to bee full of hony, and then return they home, and take it.

Ambros. Leo Problem. 180.

What is the reason why among the *Sarmatians* there is plenty of hony, and in *Africa* small store of Bees? And hee renders this as a reason, the plenty of trees, and variety of flowers, which in a few dayes after the snow is dissolved, embroider all the fields, and the many Fountains and Rivers wherewith they are much delighted.

Whereas in *Africa*, the fruits and the flowers by the violent heat are quickly withered, and the waters are scarce, so that of necessity those things being wanting wherein Bees delight, there must needs bee few, or in some places none at all. His reason is not worth an answer, had hee been read in history, hee might have learned the contrary. *Jo. Leo*, *Joan dos Santos* would have (besides many other credible Authors) convinced him of the plenty of Bees in *Africa*. But no wonder if hee were a stranger abroad that was ignorant of Countries near home.

Hee affirms that in *Germany*, *France*, *Britain*, *Italy*, there are none, or few Bees, because (if you will beleeve him) there are few trees, fruits, waters.

Andrew Battel in Purchas Pilgrims second part l. 7. c. 3.

In *Angola* they have great store of hony, which they thus procure, they hang in the top of the Eliconde tree a hollow peece of wood, or chest, which the wilde Bees being there numerous, quickly finde, and laboriously fill once in a year with hony and wax; which the Negroes then take with smoke, rewarding the industrious creatures with robbery, exile, death.

It will not bee altogether impertinent to give you a descripti-

on

on of this tree, with which the Bees are more delighted than any other. The Eliconde-tree is very tall, and exceeding great, some as big as twelve men can fathome, spreading like an Oak, some of them are hollow, and from the liberal skies, receive such plenty of water, that they are hospitable entertainers of thousands in that thirsty Region. Once have I known three or four thousand remain at one of those trees, and thence receiving all their watry provision. The Negroes climb up with pegs of hard wood (which that softer easily receiveth, the smoothness, not admitting other climbing) and I think that some one tree holds forty tun of water. This tree affords no less bountiful hospitality to the back, than belly, yeelding (as her belly to their bellies) her back to their backs, excepting that this is better from the younger trees, whose tenderer backs being more seasonable for discipline, are soundly beaten for mans fault; whence came the first nakedness, whereby one fathome cut from the tree, is extended into twenty, and is presently fit for wearing, though not so fine as the *Juzanda* tree yeelds, which yeelds excellent cloath from the inner bark.

This tree is alwayes green, of a strange form, especially in the branches that grow very high, and cast down very small threds, which touching the earth do bring forth roots, from whence other plants or trees do spring forth most abundantly in great numbers. By like beating of their Palm, they make Velvets, Sattins, Taffeties, &c. But I deviate too far from my subject. Linschoten 2. Book.

The burning of Waxen-candles on Candlemass-day had its original from the *Roman* Sacrifices called Februals. Beat Rhenan. annot. in 1. lib. Tertul. advers. Marcion.

Bears are much tormented in their eyes, which is a principal cause why they so much desire to eat hony out of the Hives, that being prickt, and stung with the Bees, their throat, especially receives a phlebotomy, or blood-letting, for they have no better remedy to ease their brain and eyes burdened, and overcharged with humors. And. Thevet. Cosmographie de Levant. c. 7.

In the Island of *Seylan* are certain barbarous people called *Pachus*, they live naked in the woods and thickets, their principal food is Dears flesh, whereof there is great abundance, which they shoot and kill with their arrows, and cutting them in peeces, filling the trunks of old hollow trees with hony, whereof they Texeira l. 1. c. 35.

have

have plenty, then they put the flesh therein, and let it remain there till times of necessity, and then eat it, conserving it onely in the hony, without any corruption.

Hackluit's Voyages, 2. part of the 2 Volume.

In the Country of *Benin* on the coast of *Africa*, is such plenty of hony, that the Natives bring to the English trading there, earthen pots of the quantity of two gallons full of hony, and hony-combs for a hundred shells.

Joaon. dos Santos liuro primeiro da Ethiop. Orient c. 23.

About *Sofala*, and generally in the Oriental *Ethiopia*, breed *Zangaons* (if I be not not mistaken, Bees) after this manner. They make a ball of clay, and stick it in the walls or tiles of their houses, with many holes after the fashion of a Bees, or Waspes-comb, and in every hole they put a Worm or Maggot, like those that breed in Cabbages, some green, others black, others white, others gray; so that they are not all of one kinde, or cast; but whatsoever they finde, they take and carry it unto the comb that they have made of clay, and in every hole they put a worm, and stop it up with fresh clay, and so inclose all the worms in their several cells, and there within they generate other *Zangaons*, (or Bees) (understand by generation of others, onely their transmutation, whereby they are others from what they were, and the following words import as much) with legs and wings, which when they are perfected, eat through the clay, and come forth, and flye, and after they are grown great, they make a like brood. So that of strange children of divers casts or kindes, they make proper children. A thing, saith the Author which much amazed mee. But whether these make hony, or are any wayes beneficial to them, the Relator is silent; but being a general practice, it is more than probable that they are some way profitable.

Varro.

Great is the profit of Bees in some places, *Varro* reports of two brethren in *Spain*, who had left them by their father a little Farm-house, and about an Acre of ground which they repleniſhed with Bees, and seldome made less of their hony, then ten thousand *Sestertia* yearly, a prodigious, and I think unparelleld increase.

Menna a Hermite in the Province of the *Samnites*, had for his subsistence, only a few Hives of Bees, which when a *Longobard* thief had stoln, he was possest of the Devil, till *Menna* by his prayers freed him.

Heraclius

Heraclius the Emperour having Warre with the *Persians*, and wanting mony (the people being before impoverished by him, sent one *Nicetas* to *Alexander* the Patriarch to borrow of him the Treasures of that Church (as he did of others) who notwithstanding his refusal, carried away all he could finde but only one hundred pound of Gold; but while they were going away with it, there were certaine men that brought, as a Present, several Pots of Hony (which by a Miracle) to supply the Patriarks necessities, when they opened them they found all turned into Gold. Baron. annal. Eccles. t. 8

I subscribe not to some Papists, who pretend there is a great Majesty in their Holies (whole-lyes) from the burning of Waxen Candles, and that waxe candles for that purpose used, cannot without great Sacriledge be taken away. Valfridus, Strabus, lib. 2. in vita S. Galli.

A certaine Country-man stole a waxe candle from the Altar, and found it turned into a stony hardness, whereby melting, he acknowledged his guilt before many that stood by, and the waxe candle recovered his former softness. I might be large in such Legendary relations, but these are enough, if not too many.

CHAP. XXVI.

Observations Physical and Chyrurgical.

THe use of Hony with Bread to old folks makes them live long, for it keeps and preserves all the senses sound and entire. It is reported that *Pollio* being asked by what means men might live long and healthy, answered, by anoynting their outward parts with Oyle, their inward parts with Hony. The fruit therefore of the Bees, saith *Ambrose*, is desired of all, and is equally sweet to Kings and Beggers; and it is not only pleasing to Princes, but also profitable and healthful, it sweetens their mouthes, cures their wounds, and convaies remedies to inward Ulcers.

Democritus continued his life with the frequent eating of Hony; and bread with Hony was the *Pythagorians* meat.

Atheneus dipnosophist. l. 2. c. 3

Aristoxenus said, they might live long without Diseases who always fed of it at dinner.

Gorop. Becan Nilostop. lib. 3

Goropius commends the hony gathered of the Heath, before the *Spanish* hony gathered of *Ladanum*, and divers kindes of *Costus*, and that because it is sweeter, and not so hot as the hony gathered of Stechados and Thyme; it opens obstructions, attenuates gross and thick, cuts and cleanseth viscuous humours, and is especially profitable for those that are troubled with the spleen.

Pliny most of all commends that hony which the Bees gather in the Dogg-dayes, almost thirty dayes after the Solstice, for saith he, after the rising of every Starre, especially the greater ones, or the Raine-bow, if showers follow not, and there be a warme dew with the rayes of the Sun, Medicines, not hony are produced, heavenly gifts for the eyes, ulcers, and bowels, which if it be preserved, the Dogge-star being risen, and if by chance it fall out in the same day there be a rising of *Venus*, or *Jupiter*, or *Mercury*, there is no such sweetnes nor vertue in the supposed heavenly Nectar, to keep Mortals from Diseases, though otherwise deadly; but we have little of this in our Country, where the Hony-gathering is then almost finished, but that which is found in the lower parts of the combes, and some little that is not shut up with waxen covers.

Hony is hot and dry in the second degree, wherefore *Galen* forbids it such as were Hectical, have a Feaver, or the Jaundies, and young men; but commends it very much in cold effects, and prescribes it to such as had moyst stomacks, for moderately eating of it, it wonderfully nourisheth, and causeth both a good colour and constitution.

Hony with age or long boyling becomes bitter; it gives life to Wine when it is flat, Flowers, Fruites, and all simple and compound Medicines by mixture of it are preserved from putrefaction.

Hony corrupts by crumbes of Bread, and therefore they that sell hony, are careful lest children passing by dip their bread in it, and so it is transmuted into Ants, or little Creatures like them, if we beleeve *Paracelsus*.

Paracelsus. Hippocrat.

Hony mixt with other things nourisheth, and makes a good colour, but eaten alone attenuates rather than refresheth, for it pro-

provoketh urine, and purgeth too much.

Hony warmes and cleares Wounds and Ulcers, attenuates and discusseth excrescencies in any part of the body. Galen & Avicen.

It is very effectual to produce hair in baldness, for Quotidian Agues, especially oyle of hony distilled. Galen.

Distilled water of hony makes a smooth skin, provokes urine, diminisheth heat in Feavers, easeth the obstructions of the bowels, quencheth thirst.

The salt of hony of all Corrosives is least painful, and most energetical, and therefore in the flesh of the yard by Chymicks, and expert Chyrurgians especially commended.

The Epicures who chiefly studied health and pleasure, did eat continually *Ambrosia*, which consisted of a tenth part of honie, as *Tzetzes* reports, concluding that the daily use thereof would prevent griefs, and keep them free from Diseases. Tzetzes.

Hony infused warme by it self wonderfully helps, exulcerated ears, especially if they cast forth ill savours, as also their singings and inflammations. Galenus.

Hony, Butter, and Oyle of Roses, of each a like quantity warme, helps the paine of the ears; he also commends Hony, and infants dung brayed together in the dulness of the sight, and for white spots in the eyes. Marcellus Empyricus.

The rheume or droppings of the eyes in men or horses are hereby helped, I have cured a Horse stone blinde with Hony and Salt, and a little crock of a pot mixed, in less than three daies, it hath eaten off a tough filme, and the Horse never complained after. Vigetius.

Hony wherein Bees are drowned, or Ashes of the heads of Bees, with hony, clear the eyes; *Attick* hony, with the first dung of a young infant, and the milk of the Nurse mingled together, and annoynt the eyes that are dull upon what occasion soever, but first binde the party, for such is the violence of the Medicine that he cannot otherwise patiently endure it, and the benefit is so forcible, that in the third day it wil make a clear sight. Marcellus Empyricus.

Nothing is better for infants that breed Teeth, or in the Ulcers of the mouth than butter and hony; *Galen* prescribes only the gums to be rub'd with it, for it conduceth wonderfully to the

generation, conservation, and whiteness of teeth: for difficulty of breathing, and to cause spitting, hony alone or mixed, is very availeable.

Hippocrat.

Galenus & Celsus. Abynzoar.

Hony boyled with Bees, or new Cheese, stayeth a looseness, helps the Bloudy-flux and Chollick. But before hony be used it is necessary to clarifie it; Thus, take of hony and fountaine water of each two pound, continually scum it as it ariseth, to the consumption of the water, afterwards clarifie it with the whites of twelve eggs.

Valleriola in locis com. lib. 3

Hony nourisheth not only because it is a kinde of nourishment, but also because mixed with other things, it is a cause that they are more easily carried through the body; and he counsels old men to use it much, if they would have a care of their health, and live long without Diseases, and he asserts it by the examples of *Antiochus* the Phisitian, and *Telephus* the Grammarian, who were old men, and did eate *Attick* hony and bread; and *Galen* testifieth the same, with often eating hony boyled, seldome raw, and yet *Galen* forbids long, or too much boyling, because it will make it bitter.

Galen lib. 3. de sanitat tuend. c. 4. & c. 8

Cornelius Celcus, lib. 2. c. 3

Celsus reckons up boyled hony among such things as stop a Lask, the reason is, because the acrimony by boyling is taken away, which is wont to move the belly, and to diminish the vertue of the food.

The bodies of Bees taken newly from the Hives, and powdered, and drunk with Diuretick wine, powerfully cures the Dropsie, and breaks the Stone, opens the fountaines of urine, and heals and helps the stoppages in the bladder.

Bees drowned in hony, and so killed, stay vomitings, and are profitable for deafness.

Bees powdered cure the Wind-collick, mollifie hard ulcers in the lips, and also the Bloudy-flux.

Hollerius.

Hony mixed with powdered Bees and so taken, is helpful for the crudities of the stomack, it is also good for the stomach.

Galen in Euporistis.

Pound Bees dead and dry in the combes, mingle them with hony, and annoynt bald places of the head, and the hairs wil spring afresh.

Erotis, c. 6. de morbis mulier.

The ashes of Bees ground with oyle, make hair white.

Take twelve or fourteen Bees powdered, in any thing every morning, and it helps such whose retentive faculty is weak, so that they cannot hold their water.

Oxymel

Oxymel is made of water, vinegar, and hony, now water is mingled with it, that by long boyling that may be resolved or loosened which the windiness raiseth up, and that it may be more readily skimmed. In a word, that the working of the Medicine, by the mixing of water might be weaker, and more easily dispersed into the body, and hony is added to resist the flegme. Mesue.

One ounce of hony and vinegar mixed together ariseth a certain third faculty which was in neither of them before, which is most powerful and certaine to attenuate, cut, resolve thick and tough excrements, which have been bred a long time in the Stomack and Liver, and those that settle on the joynts, and cause lasting Agues.

It is made thus, take of vinegar one part, two parts hony, and twice as much water as hony; first, let the hony and water be boyled, and when they have been well skimmed put in the vinegar, and boyle them still, continually skimming them, let them boyle till there be an unity of qualities, and the vinegar be not raw, or crude, it is given from one ounce to three; *Galen* saith, if you will make it the stronger, adde as much vinegar as hony; it drives out thick and gross humours, and is profitable for the Sciatica, Falling-sickness, and the Gout; good also to gargarize with, in a Squinancy. Galen. lib. 4. de sanitat. tuend.

Water distilled of hony four times by a Limbick, so that the hony were first boyled, makes beautiful hair, kills Lice and Nits; the hair wet therewith doth not only become yellow, but softer, and increaseth likewise, especially if it bee done in the Sun; it heals swollen or bloud-shotten eyes, and helps the hurt corners of the eyes, it is excellent for burnt places, most of all for such as are soft and tender, so that no scar will be left.

It must be distilled in a Glass Still, but first mixe with it pure and well washed Sand, and make a soft fire. The first water is cast away, the second is preserved, which hath a golden colour, and red at the last; the red purgeth out corruption in putrid wounds if they be washed with it, and a linnen cloth moystened in it, be laid upon them, and when it hath purged them, it produceth flesh.

Hony when it is distilling is wont to swell, and flow over when it grows hot, this is prevented when the distillation is performed by a woodden Sieve (made with hair) being

placed within the cover, so that it toucheth the hony.

Hieron. Rubeus, sect. 2, c. 8

Reubeus distilleth it otherwise, and adds other cautions: he saith, the water is with difficulty drawne out of the hony, because it readily as the fire grows hot, ascends to the top; wherefore some mingle glass with it, others sand, the most doe annoynt the Still within with oyle; but it is best distilled especially where they purpose to use the dregge, by wetting linnen cloathes in water continually, and spreading them on the head and sides of the Still, and a soft fire below, by which the swelling thereof is resisted, and leaving much vacuity and emptiness in the Still, so that it be filled a fifth, or at the most a fourth part; but because sometimes a larger fire is necessary, the cucurbite must be well crusted with clay. It is excellent for a Catarrh, Cough, Spleen, &c.

Andernacus dial. 7. com. 2

Oyle also is distilled out of hony, let hony in the combes bee put into an earthen vessel, and well macerated in warme Horsedung, until the waxe being separated from the hony, swims aloft, which being taken off, let some Flint-stones be mingled with the hony, and little peeces of glass; the first water when it is distilled is very sharp, and then comes the oyle. It is singular for the Gout, and for the cure of all Wounds.

Aldr. lib. 1. de Insect.

Oyle of Waxe is thus made, let two pound of new odoriferous waxe be melted in a Frying-pan, and then poured out into a vessel filled with Muskadine, or other generous Wine, and let it continue there until it be cold, after taken out and squeezed well with your hands, and againe melted and poured into the Wine as before, and let it be seven times reiterated; and then let it be melted againe, and three handfuls of beaten Bricks put into it, let them be well mixed together, and being all cold, let them be put into a Glass Limbeck well stopt with clay, and the joynts well lined therewith, that there be no expiration; then let a little fire be made underneath until the Cytron phlegme ceaseth to run, and then let another vessel be set under, and the fire a little increased, until the drops be first thick, and then of a Cytron colour; and lastly, drop true oyle of waxe, and let this be received in a proper vessel, mixed with the thick droppings, and let it be made thick, and like butter congealed. And now the fire must be enlarged until thick drops doe againe distill, which as soon as you see let the vessel that receiveth the

oyle

oyle bee removed, and another placed to receive the remainder.

Oyle of wax heals the cracks and chaps of the lips or paps, and hinder not the childe from sucking, and take off all superfluous excrescences by drying, and are especially good in cold griefes. It is good for them that are troubled with the stone, provokes urine, helps the Palsie, Sciatica, contracted nerves by anointing or drinking of it; kills worms of all sorts, helps the pain of the back, cures a distempered spleen, a drop injected into the nostrils opens their obstruction. It conserves the memory, confirms the brain, asswageth the Toothach, brings forth the dead or living childe, opens the veynes, frees the lungs from thick superfluities, with sirrup of Violets, helps the Asthmatick, cures *running eyes, &c.* Mizaldus appendix ad centurias.

Wax, saith *Galen*, after a sort, holds a middle of things that heat, cool, moisten, and dry, and hath some kinde of thick and stopping parts, and therefore it may seem not onely to dry, but by accident also perhaps to moisten, hindring perspirations; and therefore is the matter both of heating, and also cooling medicines, and although forbidden to bee taken inwardly, yet some make Pills of wax, and others mix it with other costives, and give it for a violent loosnes. Galen lib. 7. de simpl.

Dioscorides prescribes it in broth for ulcers of the bowels, for all wax saith hee, mollifies heats, moderately fills the bodies (which as *Dalechampius* expounds, produceth flesh) in hollow ulcers, and *Pliny* confirms the same. Dioscorid. l. 2. c. 75. Dalechamp. l. 22. c. 24.

New wax, and sofr, saith *Galen*, is better than old, for medicines; yellow wax for the aery nature, doth mollifie, more loosen, and resolve the malady. And therefore new wax is often prescribed, for being often melted, it loseth the aery nature, is more earthly, and answers white wax: And white wax is most refrigerating, is most profitable for inflamed rains where the matter is to bee repelled, which yet, saith *Aldrovandus*, is neglected by practitioners in Physick.

There may bee admirable baths made of hony, which are excellent for Aches, and strong Itches, Mr. *Remnant* saith, that a friend of his had such a foul itch, that hee was like a Leper, whom hee thus cured: Mr. Remnant.

Hee took an empty Wine cask, called a Pipe, and took out

one

one head, and made a liquor of water and hony, making it pretty ſtrong with the hony, and heat it as hot as hee could endure to ſtand in it, and put it into the Pipe, and cauſed him to ſtand in it up to his neck a pretty while, and this hee did three dayes one after another, and hee was recovered as clear as ever. The like experience hee made for Aches. If they bee renewed with a little hony every day it will bee better.

Olao Magno hiſt. delle coſe ſeptentrion, l. 22. c. 16.

In the Northern Regions are few Phyſitians, but the healthfull aire, wholeſome food, and eſpecially their Mead are inſtead of the beſt phyſick.

Mead, the elder it is, being well boyled, ſome ſay, ten, or twelve years old, is moſt ſovereign, and a preſent remedy for many diſeaſes.

Butler Fem. Mon. part. 2.

Mead, or Hydromel is of two ſorts, the weaker, and the ſtronger, Mead, and Metheglin.

For the making of Mead, if the Muſt, when it is altogether, bee not ſtrong enough to bear an egg, the breadth of two pence above it, then put ſo much of your courſe hony into it, as will give it that ſtrength, which is ſufficient for ordinary Mead. And afterwards untill night, ever now and then ſtir it well about the tub: According to the quantity that you will make, ſo muſt you add a proportionable meaſure of hony and water, namely ſix of water for one. The learned Phyſitian *Lobel*, requireth this proportion of ſix to one to bee boyled to four. His receit of Spices is Cinamon, Ginger, Pepper, Grains, Cloves, *ana* two drams. The ſecond morning put to the Muſt the ſcum of the hony, ſtir all together, and ſtop the tub a little backward. When it hath ſetled an hour or two, draw it out to bee boyled. And when you ſee the grounds begin to come, ſtay and let the reſt (ſave the very thick grounds, which caſt to your Bees) run into ſome veſſell by it ſelf, which when it is ſettled, pour out into the boyling veſſel through the cleah ſieve, and caſt out theſe grounds alſo into you garden.

Mathias de Lobel.

This Muſt being ſet over a gentle fire, when you ſee the ſcum gathered thick all over, and the bubbles at the ſide, begin to break it, having ſlacked the fire, to ceaſe the boyling, skim it clean. Then preſently make a freſh fire to it: And when you ſee the ſecond ſcum ready, having ſlacked the fire again, take it quickly away; then make to it the third fire, and let it boyl to

the

the wasting of a fourth part, if it bee made of the washing of combs; and to the wasting of one fifth or sixth part, if it be made of clean hony; not ceasing in the mean space to take off the scum as clean as you can. One hours boyling may suffice; but if the Mead bee of clean hony, it may as well bee done in half the time. Instead of twice slacking the fire, you may twice cool the boyling Must with cold Must reserved; or else bee sure that it do boyl all the while onely at one side, and not all over. After all this put in the Spices, *viz.* to a dozen gallons of the skimmed Must, Ginger one ounce, Cynamon half an ounce, Cloves, and Mace *ana* two drams, Pepper, and Grains, *ana* one dram, all grosse beaten, the one half of each being sowed in a bag, the other loose, and so let it boyl a quarter of an hour more.

The end of boyling is throughly to incorporate the boorn and the hony, and to purge out the drosse, which being once done, any longer boyling is unprofitable, as diminishing more the quantity than increasing the strength and goodness of the Hydromel.

As soon as it is boyled enough, take it from the fire, and set it a cooling; the next day when it is setled, pour it through a hair sieve, or linnen bag into the tub (reserving still the Lees for the Bees) and there let it stand covered three or four dayes till it work, and let it work two daies. Then draw it through the tapwaze, and tun it into a barrel scalded with Bay-leaves, making the Spice-bag fast at the tap. If there remain much grounds, you may purifie them by boyling and skimming, as before; but this will never bee so good as the first, and therefore you may put it by it self, or with some remainder of the best, into a small vessel to spend first before it be soure. If the Mead bee not much, you may tun it the next day, and let it work in the barrel. Being tunned it will in time bee covered with a mother; which if by jogging the vessel, or by other means it bee broken, the Mead will turn sowre. But so will it make excellent vinegar, and the sooner, if it bee set in the Sun, which the longer you keep, the better it will bee.

Metheglin is the more generous or stronger *Hydromel*, for it beareth an egg the breadth of a groat or sixpence, and is usually made of finer hony, with a less proportion of water, namely four measures

for one; receiving also in the composition as well certain sweet, and wholesome herbs, as also a larger quantity of Spices, namely to every half barrel, or sixteen gallons of the skimmed Must, Eglantine, Marjerom, Rosemary, Time, Winter-savoury, *ana* half an ounce; and Ginger two ounces, Cynamon one ounce, Cloves, and Mace *ana* half an ounce, Pepper, Graines, *ana* two drams, the one half of each being bagged, the other boyled loose. So that whereas the ordinary Mead will scarce last half a year; good Metheglin the longer it is kept, the more delicate, and wholesome it will bee; and withall the clearer and brighter.

One excellent receit, I will here recite; and it is that which our renowned Queen of happy memory did so well like, that she would every year have a vessel of it.

First, Gather a bushel of Sweet-briar leaves, and a bushel of Time, half a bushel of Rosemary, and a peck of Bay-leaves; Seethe all these, being well washed, in a furnace of fair water; let them boyl the space of half an hour, or better; and then poure out all the water and herbs into a fat, and let it stand till it bee but milk-warm, than strain the water from the herbs, and take to every six gallons of water, one gallon of the finest hony, and put it into the boorn, and labour it together half an hour, then let it stand two dayes, stirring it well twice or thrice each day. Then take the liquor and boyl it anew; and when it doth seethe, skim it as long as there remaineth any dross. When it is clear, put it into the fat, as before, and there let it bee cooled. You must then have in readiness a tub of new Ale, or Beer, which as soon as you have emptied, suddenly whelm it upside down, and set it up again, and presently put in the Metheglin, and let it stand three dayes a working, and then tun it up in barrels, tying at every tap hole by a Pack-thred, a little bag of Cloves and Mace, to the value of an ounce. It must stand half a year before it bee drunk.

If you marvel that so great a quantity of water is required, it is partly because of the goodness of the hony, which being pure and fine, goeth further than ordinary; and partly that it may have the longer time in boyling, before it come to its strength, and therefore some will have eight parts of water to one of hony, but then they boil it so much the longer. The third part at least being wasted,

CHAP.

CHAP. XXVII.

Of divers kinds of Wild-Bees.

THere is one kind not half so bigge, as a Hony-Bee, with a bright shining green head and fore-part; she hath longer horns than a Hive-bee, she hath four wings, her neather part is of a light shining Carnation on the out-side, the belly of a greenish shining glistring colour, almost as bright as the shining of a Glo-worm, with a very large long sting (not forked) or somewhat like to a sting, I could not force it to enter it into my hand, whether it wil sting I know not; that which is equivalent to the skin is as it were continued without ringles; this Bee is very strong, gathers as the Hive-Bee sandaracha; and breeds in holes of old posts, divers near one another, we may call her the glistring Bee.

There is another sort of Wild-Bee which is very laborious, she is not so great as a Hive-Bee by a third part, but in shape and making altogether like her, the mouth opens side-ways, wherewith she holds very fast, like pinchers, her hinder leggs are of a tawny colour, the ringles of her hinder part gray, the rest of a blewish black, her fore-part is partly black, and partly gray, she useth to abide (if my memory deceive me not) in Brick-walls, in holes in the morter between the Bricks, many near one another; we may call her the Mortar-Bee.

There is another sort not half so great as the former, but grayer, she diggs or mines perpendicularly into stiffe clay ground in High-ways, or Foot-path sides, the earth that she works out, lyes round about her hole like the casting of a Worme, but much finer; after she hath entred three inches right down, she makes traverse holes one under another, sometimes two, sometimes three in breadth, as several cels, or chambers where she breeds her young, which are not Worms at first, but have a perfect shape of a Bee, herein concurring with the Queen-bee, and though she be laborious, and gathers much Bee-bread, yet could I never finde any thing provided before-hand, or laid up in any cell, but all is consumed by the young, of which I have found neer forty belonging to one down-right hole (not come to

maturity, and maintained by one) all in several cels or partitions one above another, the transverse holes being open to the down-right, that so they may be visited and fed by the breeding or Mother-Bee, which confirmes my former assertion of the old Bees feeding the young. This sort of Bee is very Political, living by hundreds, nay thousands near one another, but each in a distinct mansion, we call them the Earth-Bee.

There is another sort about the length of a Hive-Bee, but broader and greater made, like a small Humble-Bee, but differing in colour, she hath a round head, broad face, with long horns on the head, a ring of yellow turning upwards, above the mouth the chaps are indented, and hold like Pincers, the back and head are of a dark russet, six dew-clawed feet of a light browne, she hath four wings, her neather part is of a dark black, with five yellow spots on either side of the edges of every ringle, she hath a broad tayl; this kinde copulates often openly, while she is at work all the Summer; the furres, or darts too and fro as she gathers, without a Sting, makes a louder and clearer sound than the Hive-Bee.

There is also a smaller sort of this kind, in nothing differing but in the magnitude, these breed in clay-walls of houses and barns, in holes in the clay which they make many together, like several inhabitants to make a Town, but each hath her peculiar house, or hole.

There is another sort of wild Bee, altogether as long as a Hornet, but the neather part not above half so great; it hath eight ringles, the three next the incision of a shining black, the four next towards the tayl, which grow all less one then the other downwards, of a light Orange, and the tayl of a bright brown, the fore-part and wings (which are but two) and belly are of an Orange colour, the head not very round, the mouth piked, or like a Birds bill, but the lower chap longer than the upper, which opens not sidewaies as other Bees, but one over the other, two short horns on the head, but two wings orange coloured, somewhat shorter than the body, six dew-clawed feet of an Orange colour likewise, she buzzeth not so loud and smart as the Scarabee, she lives by foot-path sides, and bare places of fields, of a quick sight, and not easily taken, without a sting, copulates frequently, feeds on Flies and Grashoppers,

and

and this observe as a general rule, that few of those sorts that have but two wings gather Bee-bread; I might describe divers others, but not being able to recite any particulars of them, I will not trouble the Reader any longer.

CHAP. XXVIII.

Of the Waspe.

A Waspe is a flying oblong Insect with four wings, of a bright Ash-colour, the two inmost neither half so long, nor so large as the out-most, six yellow dew-clawed feet mixed with Chesnut-colour towards the extremities, two black moveable horns on the head, growing on either side as high as the top of the eyes, the head is black and hairy, the fore-head divided into three yellow spots, with a black stroke down the middle, the jaws yellow without, black at the mouth, the jaws hath not the solidity of a bone, but is like a strong gristle, indented like a Saw, the back is for the most part of a shining black, and the belly also, the neather part is a bright yellow in the scales, but black bars, in the opening of the upper scale, the black inlargeth it self towards the middle of the scale; and lastly, she hath a venemous spear wherewith she will prick often (contrary to the Bee) for it is not barbed.

The Waspes Nest is begun of one, not many mother Waspes or breeders as some imagine; the mother Waspes goe not abroad after they have bred many young, but are maintained by their posterity at home; whether the old breeders continue longer than a year *Aristotle* questions, and *Scaliger* likewise, but determine not, it being a secret not then known; but it is apparent they continue no longer, for their wings are worn, and thereby are they disabled for flight, much more for breeding.

The mother Waspes have stings, and use them, and the reason of their abode at home, is not because they are great and heavie bodied (as some) for their wings are proportionable to their bodies, but with their much working in the Spring, making their Nests alone, breeding and feeding their young they wear

Arist. de hist. anim. lib. 9. c. 65.

their wings, and therefore after a while ſtirre not abroad, but order all at home.

The Waſpes Neſt is made for the moſt part in the ground, (ſometimes in the thatch of a houſe) in a hole begun by a Mouſe, or Mole, not very deep, about a foot and a half, ſometimes two foot from the entrance, for the manner of their work, making of their combes, breeding and feeding, they doe almoſt wholly agree with the Hornet and the Bee, for Bees, Hornets, and Waſpes are alike in all, as an Aſſe, Horſe, and Oxe, and how Hornets breed. See *Cap.* 10. *pag.* 43.

Scalig. comment. in Ariſt. de hiſt. lib. 5. c. 19.

The Waſpes Neſt is made Oval, ſome conſiſt of eight combes or ſtories one beneath another, faſtned ſtrongly by many peggs, or pins one to another, about three quarters of an inch diſtance between combe and combe, the middle combes are about nine inches in the Diameter, all round, and the whole involved with a five or ſix doubled folding, or watered cover, yet all wrought into one intire peece, conſiſting of the ſame matter with their combes, being greeniſh, ruſſet, and gray, whereas the combes are of a dark ruſſet, with only one hole through the middle of the cover, bigge enough for one Waſpe to enter at once; the cover is faſtned with ſome pins to the ground, or rootes in the earth.

The middle of each combe is ſomewhat Piramidall, bending upwards, and hollower in the inſide than the outward part of the combe, and the center hath a very ſtrong pin to faſten it to the next combe, which runs like the axeltree or maine poſt through them all, and in leſs ſpace than every inch in the whole breadth, are rows of pins, or pillaſters, which faſten each combe very firmely to the next, ſo that they wil not eaſily be ſeparated. And herein they ſeeme to have been exemplars of Architecture rather than Bees, faſhioning all their combes orderly, ſtrongly, uſefully, and comely; the pins or props are framed broader, & bigger, both at the top and bottome, than in the middle, with two or three buttereſſes both above and below, whereby they hold more ſtrongly, and being ſmall in the middle, leſs hinder their paſſage about the combes.

The Waſpes combes are plaine on the upper part, but filled and furniſhed with hexangle cells downwards, the cells are not ſo deep, nor yet ſo long as the Bees, and they are not made ſtraight,

ſtraight but aſloop, that the young may not ſo readily fall out as they would if they were directly downwards.

The ſeed is at firſt almoſt as ſmall as a Muſtard-ſeed, of a darkiſh white, not ſpherical, but oval, and they faſten it not to the bottome of the cell (*ſed ad cellæ latus apum more*, ſaith *Ariſtotle*) but to a corner or angle, a pretty diſtance above the bottome, and obſerve (for the moſt part) an exact order in diſpoſing of their ſeed, that they keep the ſame angles in every cell, not one in an angle of the South-ſide of a cell, and another in an angle of the North, or the Eaſt, but all in the South, ſo that the ſeed lyes orderly in rows: But if one layes her ſeed in the contrary angle (as ſometimes, though ſeldome) then the next takes it for a rule, and it is punctually obſerved perhaps through a whole range of cells. Ariſt. de hiſt. Animal. l. 5. c. 19.

This ſeed being hatched (for the manner how, ſee the tenth Chapter) grows a little while by vertue of the ſeminal power, it ſticks at one end, bending towards the middle of the cell, but ſomewhat erected (or rather dejected, for the head is downward) that it may receive food, and when it fills the breadth of the cell, it grows looſe, and falls (or to ſpeak properly aſcends) to the bottome of the cell, for the mouth of the cell is downwards raiſing it ſelf; and now the mouth of the worm begins to bee viſible, and it is daily fed, as wee noted of the Bees (for they are Inſects of the ſame nature) but ſomewhat degenerating; and *Pliny* ſaith, in *fœtu, eadem prope natura quæ apibus*, and grows to the full dimenſion of the cell: when as wee noted in the Hornet, it grows dull and torpid, and refuſing meat is ſhut up by a cover wrought over the head: But to return back a little. Georgius Piſcatorius.

At firſt, after the ſeed is hatched, it is oval towards the head, near to the tail there is a blackiſh ſpot; It will contract it ſelf almoſt round, ſometimes as a Caterpiller, when it moves, as if it would go, for indeed the worm makes no progreſſive motion.

If you break the worm, in the body is a thick wateriſh humour, with a harder ſubſtance, like a black liſt in the middle of it, and that from end to end.

The tranſmutation begins to bee firſt viſible in the ſuperior part, and the eyes are firſt diſcerned, and the inciſion between

the

the head and the shoulders; which yet as it grows more perfect, becomes smaller, the middle incision is scarcely visible, when the eyes may bee seen, then the legs, and the horns begin to bee framed, and the wings are last finished. When they are perfect, they thrust up the covers over their heads which hang at their backs until they come forth.

They excern an excrement while they feed, which is contained under them in the bottome of the cells, but assoon as the young eat their way forth, the older Waspes carry it out of the neast.

The young Waspes (though the combes bee taken out of their neasts) that are shut up (not the other, for they must bee fed, or they will dye in three or four dayes) will come to life, and perfection, although slowly, because of the small heat; but for above three weeks I have had them in a chamber successively come to perfection.

Scaliger com. in Arist. de hist. l. 5 c. 19. Arist. in loc. pred.

They gather no hony, that is, make it, rob they do, but then they spend it as fast as they get it, yet *Scaliger* saith mellificant, they begin to breed in the latter end of the Spring, contrary to *Aristotle*, who saith, they breed not in the Spring, but Autumn, whereas they miscarry by the end of Autumn.

They breed first their own kinde, and by the end of *August*, ordinarily have fledge Drones, which are about the greatness of an old working Wasp, but somewhat longer, whose covers they heighten above the combs when they shut them up, but in cells no greater than the Waspes.

The Drones have no sting, they have two testicles, which on crushing are easily discovered, and they are coated with a hard black tunicle, joyned together like a pair of breeches, sharper towards the point, but broader upwards, and at the upper end not coated, but full of a whitish liquor; the testicles are somewhat like, but that they are united together to the young coated Grashoppers whilst they are in the dams belly.

The Drones are not of so bright a yellow as the Waspes, and their moveable horns are a great deal longer, yea longer than the mother Wasps horns, which they spread very wide like a fork, but not right forth, widening them by degrees, and towards the tops, bending them side-wayes.

Presently after they begin to breed Drones, they breed also mother Waspes, which are twice, nay almost thrice as great as the

the Drones, these begin to forsake the neast about a week in *September*, and so daily as they come to perfection, being first made prolifical by the Drones with whom they couple. The Drones continue in the neast, as long as the working Wasps, namely untill the wet, and cold in *October* puts a period to their lives. Whereas the mother Waips, as soon as they have engendered, with the Drones flye forth, and shrowd themselves in hollow trees, thatch, or such like places, where they lye in a dead sleep without feeding till *March*, when the first warm weather revives them, and causeth them to flye abroad, and then they feed, but if after they have been a while abroad, the Spring bee very cold and wet, they then for the most part, miscarry, and dy.

For the mother Wasps, they make larger hexangle cells in the lowest combs than for ordinary Wasps, and also inlarge the covers above the combs near a quarter of an inch higher than the comb, the covers and highings are very white like fine white paper.

The young Wasps are somewhat gray at first, and after turn to a bright yellow, and the Bees are more white at first, and after turn to a bright brown.

Aristotle doubted whether the Wasps lost their stings in Winter; while they are in a deep, or dead sleep, they exercise them not, but revive them by a fire, or in your warm hand, and you may experimentally affirm the contrary. That they did copulate, *Aristotle*; acknowledgeth, but whether the male and female, both had stings, hee professeth that hee was ignorant. Arist de hist. Animal. l. 9. c. 65.

Waspes are a kinde of Canibals, for they rob from all, and eat not the Bees provision only, but the Bees themselves, nay they will eat the young Wasps of another neast.

Once, Waspes are very strong, and daring creatures, especially near their neast, not fearing to anger, nay to injury the most mighty. The Poet elegantly thus expresseth it.

Spencers visions of the worlds vanity.

A mighty Lion, Lord of all the wood,
Having his hunger throughly satisfi'd
With prey of beasts, and spoyl of living blood
Safe in his dreadless den him thought to bide:

His sternness was his praise, his strength his pride,
And all his glory in his cruel claws:
I saw a Wasp that fiercely him defide,
And bad him battel even to his jaws.
Sore bee him stung, that it the blood forth draws,
And his proud heart is filled with fretting ire,
In vain bee threats, his teeth, his tail, his paws,
And from his bloody eyes doth sparkle fire.
That dead himself bee wisheth for despight,
So weakest may annoy the most of might.

CHAP. XXIX.

Of the Hornet.

A Hornet is a flying Insect, more than twice as great as a common Wasp, with four wings, the inmost smaller, and not so long as the utmost by a third part. For shape shee is like a Wasp, but differs in colour: All the back wings, and belly, legs, and horns are of a bright Chesnut colour, and some part also below the division in the middle, and then yellow scales, and Chesnut-coloured openings, or bars with spots on either side of every yellow scale, on the upper-side but more Chesnut-coloured on the under-side. Her fore-head is of an iron colour, in the middle of her for-head is a yellow spot like a heart, on either side whereof grows her moveable horns, on the out-side are her eyes oblong, and a little prominent, her face is a yellow square like a plate, her cheeks or jaws are yellow without, and black in the mouth; her jaws are a very bone indented like a saw, more thick toothed, and finer than a Grashoppers, contrary to *Aristotle*, and *Pliny* also, who affirm of all Insects, that they have no boninesse in any part, whereas a Hornets jaw, and also a great Grashoppers, are a solid bone without, and within of an equal hardnesse.

Arist de hist. animal. l. 4. c. 1.

Hornets have no fangs, their tongue is divided into small fibers: Their breathing is visible, cut off one of their heads, and you shall see (a while) an expulsion out of the neck of a whitish moisture, and then drawn in again, at first very strongly, and

and then with more weakneſs, and at laſt ceaſing, yet life continuing in either part of the divided body above an hour.

A Hornets intrals is contracted in the body, but extended, is as long as the body, they have a very large cavitie in the end of the tail, out of the middle of it, the ſting is extended and drawn in alſo as they pleaſe, it is not hollow (as ſome think) that I could diſcern; near to the tail I found in diſſecting a Hornet (and never but once) a white egg as great as a lentill, and juſt ſuch a one as I have ſeen in the combs, but never diſſecting divers Bees, and Waſps could I finde any, nor yet in Hornets (excepting one) perhaps they are very ſmall (if at all) and quickly grown, and ſuddenly ejected.

Some ſuppoſe them to bee bred of a horſe: *Cardan* of dead Mules: *Virgil* of Aſſes: *Plutarch* of a rotten horſe; and ſo alſo ſome conceit Waſpes are bred, but with us they are bred for the moſt part by generation: Of their copulation *Ariſtotle* was ignorant, they breed moſt commonly in hollow trees, in thatch, or in houſes, in empty Bee-hives, rarely (but ſometimes) in the ground: For the manner of their breeding, ſee the tenth Chapter, and the former Chapter of Waſpes, with whom for the making of their combs, hatching and feeding their young, they do altogether agree, they are not ſo prolifical as the Waſps, for their combs are never larger, and the cells being much greater of neceſſity, they muſt breed fewer: Their ſtinging is very dangerous, but otherwiſe they are not ſo miſchievous as the Waſps, for though they ſometimes kill a Bee, yet they rob not the Hives, they feed on fleſh and fruits, and moſt of all of aſhen trees, feeding of the bark, making the boughs whiter, and in Autumn gather plentifully of the Ivy, contrary to *Ariſtotle*, and others, who aſſert, they gather of no flowers, and herein to differ both from Bees and Waſpes.

Cornel. Agrippa l. de occult. Philoſ. Ariſt. de hiſt. Animal. l. 9. c. 66.

They ſting dangerouſly, ſome creatures deadly, Dr. *Penny* reports, that being at *Peterborough* in a publick ſtreet of the City, hee ſaw a Hornet purſue a Sparrow, whom at laſt ſhee ſtruck with her ſting, and therewith preſently killed her, and filled her ſelf with the dead Sparrows blood, to the aſtoniſhment and wonder of many beholders.

Penn. apud Muſæum de Inſect. l. 1. c. 9.

It is reported by *Ariſtotle*, as a ſtrange and almoſt incredible thing, of certain Mice in *Perſia*, which being diſſected, great

with young, those young not yet kindled, have been gravid, whereas in Hornets and Wasps there is a greater marvel, for the breeders coupling in Autumn, continue to bee prolifical in the Spring, and the young bred of them, not onely in the first, but in the third and fourth generation have a procreative power from their great Grand-mothers copulation.

Bil. cap. 7. 17. The water of distilled Hornets, or Waspes, or wherein they have been boyled, if it do but touch the skin, the place will swell so, that there will bee the symptomes of a dropsie, or poyson, or some great distemper; but Treacle drunk or annointed on the place, is a cure without any pain; with this Harlots and Beggars deceive the most circumspect and wary, as if they were with childe.

One thing more which I had almost forgot: If the hole in the tree wherein they breed bee large, when they bee numerous, they will work it up (all but a small passage for entrance) with the same matter whereof they make their combs.

CHAP. XXX.

Of the Humble-Bee.

THe Humble-Bee is of various magnitudes and colours, some greater, but shorter than a Hornet; others as little, but rounder and shorter than a Bee. All of them are very hairy, they have two horns, very strong indented jawes, wherewith they hold or bite very hard. Some have their heads cole-black, the upper part of the back yellow, the lower part black, they have four wings, the belly all black. In the nether part first a division or ringle of shining black without hair, then a ringle of pale yellow hairy, then a ringle of black, and so black to the taile, but thick and full of light gray haire, that it seemeth gray, shee hath six legs with scabrous feet. They carry their Bee-bread on their legs, as the Hony-Bee, but no wax, as *Scaliger*, *Pliny* and others, whether they carry the matter of their combs.

Plin. Nat. hist. lib. 11. cap. 22.

combs on their thighs, I am not certain, but beleeve it, for they gather onely on flowers, but the Hornet and Waſpe carry it in their mouth.

They breed ſaith *Ariſtotle*, on the ground among ſtones, and have two or three entrances to their neaſt, but it is not ſo; but they breed either upon the ground, in the long graſs, moſt commonly in Meadowes, and ſpared layes, or elſe in a hole in the ground, much deeper than the Waſps: all their neaſt is covered; nay environed with moſs. Ariſt. de hiſt. Animal. l. 9. c. 67.

Ariſtotle and *Pliny* are very brief in the hiſtory of them, and therefore very obſcure; ſome imagine the reaſon hereof was becauſe their nature was well known, but I rather conclude, becauſe they knew little, or nothing of them. And it is very evident becauſe they confound the Silk-worms, and the Humble-Bees under the name Bombyx, and *Scaliger* alſo as it appears knew little of them. Scaliger Comment. in Ariſt. de hiſt. l. 9. c. 66.

The nethermoſt ringles of the black Humble-Bee, are as black as jeat, clear and ſhining; nay more tranſparent, for it will reflect an image, but the many long hairs, except it bee near at hand, nay in your hand, do ſomewhat obſcure it.

It ſeems they are very rare, and ſcarce known in *Italy*, for *Aldrovandus* glories in a neaſt of Humble-Bees that was found by his Apothecary gathering ſimples, and brought to him (as hee ſaith) not onely to delight him with a novelty, but to communicate as a ſecret of nature to poſterity. Aldrovand. de Inſectis, l. 1. c. 4.

Hee ſuppoſeth them a kinde of wilde Bee, and propounds it as a Query, whether *John Baptiſt* in the wilderneſs lived not with their hony?

Aldrovand. ſuppoſeth wax may bee had out of their combs; but this hee borowed from *Ariſtotle*, who ſaith, they make wax, but paler than Bees, but melt the combs, if you can. Ariſt. de hiſt. Animal. l. 5. c. 19.

Their combs are oblong cells as big as Acorns, but not altogether ſo long, cluſtering together (one ſomewhat higher than another, ſomewhat like a bunch of grapes inverted, ſixteen or eighteen joyning together (and then another like comb lying cloſe, but not faſtened to it, and

ſo another) of a dark yellow, which (if after they have bred their young) they fill with Bee-bread, and ſome with hony; their hony is of a bright yellow, very ſweet, but not ſo pleaſant as the Beer, having a rank taſte (occaſionally) from the ground; their combes are not wax (as before) though gathered of the flowers, they are as tough brown paper, but not of ſo dark a colour, broken, they ſhew like *Japan* paper made of Cotton, woolley.

They ingender with their ayls oppoſite one to another, in the meane time reſting on ſome plant, or the ſtump of a tree, they continue long in venery, and while they copulate, often clap their wings, and make a ſhrill noyſe; their mates they chuſe in the Neſt, and are carried away by them. Theſe as other Inſects before deſcribed, after they have done breeding of Females, about the end of *Auguſt*, breed Drones for the propagation of their kind.

It is remarkable, that though the cels or pipes wherein they breed are of a like magnitude, yet the Humble-Bees in the ſame Neſt are of various magnitudes, ſome more than twice as great as others, herein differing from Bees and Waſpes, which continued in the ſame dimenſions that they were firſt Metamorphoſed into, only when they are ſtrong and luſty, ſeeme ſomewhat fuller and plumper, but when they grow old, then they grow lank and wither; whereas the Humble-bees, many of them double their firſt magnitude.

They are very laborious and hardy Creatures, working in ſuch weather when the Bees dare not, and continuing it many weeks, after Hornets and Waſpes are laid up, or miſcarried.

There is another kind of great Humble-Bee, in the fore-part exactly agreeing with the former deſcription, but the neather part is altogether of a ſhining black, and not ſo hairy as the former, it is ſharp pointed at the tayl, and hath but one cavity, out of the which cometh a ſtirg, which groweth out of the under part of the tayl, and is forked like a Snakes tongue, having two points forth-right, not barbed like a Bees, ſo that it ſtinges more than once; there are two covers on either ſide of the ſting to keep it cloſe and ſafe, and theſe are as long as the ſting, but bigger, rougher, and ſpreading on the top, I conceive to hold the

the sting in, in the act of generation; there are six partitions or ringles on the neither part, and on the outsides, especially of the fourth and fifth golden coloured hairs.

The Humble-Bee first described, affords some special rarities not observed by any, and therefore I must return to her again. In the tayl being opened, is a double cavity or hole, the one (if I mistake not) for generation and parturition, and the other for the evacuation of excrements, in the neather part (dissecting it) I found as in a Hive Bee, a bladder to which adjoyns the entral, not so white as in a honie-Bee, then you shall have (as I have often found) their young (but one visible at once) which are not excluded, torpid, and liveless eggs, but live and grow in the dammes belly; I have found some as large as great Tares (like the Worms in the combes) so that all the parts of the Worme are very visible, and these have lived after I have cut them out some houres, and would continually contract and gather themselves into a round, and then again extend themselves, but were not able to make any progressive motion, being without feet.

In the breast I perceived a little thing to pant, and beat a great while after I severed it from the lower part at the incision, when I after, opened the breast, I found four several parts like several members, but I was not able (my sight being weak) to distinguish one member from another, but concluded there was a heart, liver, and lungs, all were reddish, but some parts were more red than others.

Under the horny tunicle of the eye is a white moysture, and something white likewise, like brains in the middle of the head; her tongue is drawn so close, partly under her neck, and partly into her mouth, that it is scarcely visible, but when she works; being dead, I found it much longer than a Bees, as long as a Barley corn; she hath two fangs, on either side one, the tongue at the root is as great as a small pin, underneath of a black colour to the middle, where it is divided into three parts, two shorter on either side, and a longer in the middle, so that it hath a triple tongue; this sort that breed their young within them, are without a sting; on their bellies near the roots of their leggs, are little round reddish creatures, with very long horns, with six leggs, which run very quick and swift, which (I believe)

ſleeve) are a kinde of Lice proper to them; their taile ſtretched out, is very like their mouth, being as it were a complement of clawes meeting in a round, and this is proper to this kinde without a ſting, which I therefore call the Claw-tailed Humble-Bee.

Thoſe which breed a living creature within them, after a ſort produce it egg-faſhion, for it is covered with a thin membrane like the ſhell of an egg, but I diſcerned no ſuch membrane encircling the worm in this Humble-Bee.

Ariſt. de generat. Animal. l. 3. c. 9.

This grey Humble-Bee in the taile is ſomewhat broad, and hath two circular horny claws, or pinces not viſible, till they bee drawn out, and within them two other ſhorter but not circular.

Some creatures ſaith *Bodinus*, conceive eggs within them, and there hatch, and bring forth a living creature as the Viper, and all kinde of Whales, but neither hee, nor any other mentions this Humble-Bee.

Bodinus Theatrum naturæ l. 3.

Whatſoever ſaith *Ariſtotle*, bringeth forth a living creature and not firſt an egge, hath breaſts, and all that have breaſts, have paps or nepples except the Dolphin, which hath two pipes, on either ſide one, which the young ones ſuck: The Philoſopher, and *Scaliger* his Commentator, except not the Viper, nor the Slow-worm, becauſe they perhaps concluded, that they hatched the young of analogical eggs within the dams belly; I am ſure they ought to have excepted this kinde of Humble Bee as alſo that Flye that wee ſpake of before out of *Scaliger*.

Ariſt. de hiſt. l. 2. c. 6.

How they order their young after they bee excluded, I cannot yet determine, for I have not found any of their neaſts, ſince I obſerved this particular.

The Cells or Pipes wherein the young are bred, are not flat at the top as the Bees and Waſpes, but oval, and are all of one matter and colour, whereas the covers of the Waſps and Hornets are, though of the ſame ſubſtance, yet whiter and finer.

CHAP.

CHAP. XXXI.

Of the Grashopper.

IN the production of no creatures is nature more serious, or rather more wanton than in Grashoppers, who is able to describe their various colours? or the divers forms of their bodies, or can exactly report their walking, leaping, flying? With us some are green, some tawney, some russet, in *Ethiopia* red and yellow, in *Africa* white.

One hath written a Tractate of seven kinde of Locusts or Grashoppers according to the Scriptures, and Rabbins; and yet mentions, not those four kindes enumerated among clean creatures, and allowed the *Jews* for food, namely *Arbeth* a most prolifical kinde of Grashopper, which therefore had this name according to *Kimchi* and *Broughton*. The second kinde is *Solaam* by the Seventy, ἄτταλον, *Hieron* calls it a Scarabee, but not rightly, for it is a swift creature, going on the four forefeet, and leaping with the two hindmost which are longer than the others. The third sort is *Chargol*, which in our Bible is translated a Beetle, but there is a great difference between Beetles and Grashoppers, the *Greeks*, translate it ὀφιόμαχον, for it fights with a Serpent, and strangles it, as both *Aristotle* and *Pliny* record; and *Maiolus* in his Colloquies tells us, That his Gardener returning from work, saw one of these Grashoppers conflicting with a Serpent, which at last it killed. And therefore *Niphus* was too bold to translate it a *Scolopendra*, or Aspe, when as the Philosopher calls it a Grashopper, and the Seventy translate it a Locust. The fourth kinde is called *Chagal*, the *Greeks* call it ἀττέλαβον. It is a cruel devourer, not onely consuming the fruits, but stalks, nay barks of trees.

Fran. Stancarus. de septem generibus locust.

Levit. 11. 22.

Arist de hist. Animal. l. 9. c. 6.

In the Scripture wee finde five other kindes, *Gazza* from shaving, *Jelak* from licking, *Chasil* from destroying, *Thelatsal* from rust, which it occasions to the fruits, and *Chenamal* from staying, because it never willingly forsakes its place. *Modius* on *Joel*, and *Levit.* reckons up various kindes of the first sort called *Arbeth*.

Rhodulph Modius in Levit.

Moreover in the month of *May*, out of a spittle that hangs upon

upon herbs is produced a green winged creature, in ſhape very like the little Graſhopper, it leaps, and after flyes. Wee uſe to call the frothy matter wherein they are bred Wood-ſear, that is the corruption of the woods; I know not the reaſon of the name; others call it Cuckow-ſpittle.

In *Norwey* it often raines a little four footed beaſt, as great as a Rat, of various coloured hair, which feeds of all green things like Graſhoppers. When their food fails they dye, and the aire being corrupted with their ſtench, cauſeth to the inhabitants Megrims, and the Kings-evill. They call it *Lemmer*; this though not properly a Graſhopper, yet like them very deſtructive.

Scaliger de Subtil. exercitat. 192.

Of what form was the μελυρὶς of *Suidas*, the μυλακρὶς of *Celius*, the μαλυκρὶς of *Nicander*, βρέτλανα, ἄχηρ, πεταλὶς, ἄρπας, θολυκοτρώξ of *Heſichius*, παρνοψ of *Ariſtophanes*, μάσταξ of *Euſtathius*, ἄλιγξ and πυαλὶς, of *Phavorinus*, *Ludolochra*, of *Iſidore*, and many many others mentioned by authors differing one from another, but yet not fully deſcribed, much leſs their natures, ſo that wee need an *Oedipus* to reveal, and diſcover them.

A Graſhopper hath two very moveable horns, as long as the whole body, on either ſide of the jawes two ſhort ones; It hath two broad lips ſhutting flat on the other, and two leſſer that ſhut ſide-wayes, all which together cloſe the mouth, and the head, with the lips cloſed, ſomewhat reſembles a horſes head. It hath two round prominent eyes; *Nigidius* denied that they ſaw at all, as *Pliny* records, when as they have clear and glaſſie eyes, yet covered with a horny tunicle (the eyes are not moveable) there is a viſible *Pupilla*, ſix feet, the hindmoſt as great, and as long again as the formoſt to leap withall, and raiſe it ſelf up, with two joynts in every one, near their ſetting on to the breaſt, theſe two are very near one to the other. They have alſo a joynt in the middle, the upper part as the thigh greater at the top, and ſmaller downwards, and ſmoothe. The lower parts (which are their legges) rough and ſcabrous, and ſeveral pliable joynts in the feet, and as it were viſible toes, which are rough and dew-clawed. A long ſmooth taile more than half the length of the body, ſharp-pointed, and two ſhort little tants, or pricks growing near the end of the tail, pointing towards the extremity of it.

Plin. Nat. hiſt. l. 11. c. 37.

When,

When you hold it by the wings, though it neither stirs, nor strives, yet shall you both see and feel the whole body beat and pant, as also when it creeps, or stands still, although not so much, left of all when it is in motion. It hath four large wings, but the under wings lye folded or doubled, which deceived *Willichius*, who unwarily beholding them, took them to bee several, and therefore published that they have six wings; the under wings being open, they are very fine and membranous, near an inch broad, spreading like a sail; the upper wings are crusty or shelly.

Jodocus Willichius in suo de Locustis dialogo.

It hath as it were, a scaly Gorget, from the head to the incision or back. The back is more hard and shelly than the belly, and hath several semicircular equidistant strakes down to the belly. The belly is very soft and white on either side, all along to the tail, and green in the middle.

On the breast are sharp pricks six in number according to the legs, against each leg one. When the head is severed from the body, the jawes, the lips, the horns, all move, but the head dyes sooner than the rest of the body. The body will leap a great while after the head is off. In the stomach is a thick juicy moisture. The breast being opened, first appears the heart, and then other large members, one like the liver of a reddish colour, another less and grayer, which I suppose to bee the lungs. In the belly I have not found fewer than eighty young ones, in some one hundred. They grow quickly as great as Ant-eggs, and as long, they are first yellow and soft, full of a yellowish moisture, then ruby, then of a tawny colour, when after a certain space this softer tunicle hardens into a shining black coat, or shell, long and flattish, and these alterations are all in the same Grashopper, for in some you shall finde all without coats, in others, some with coats, and some with none at the same time.

They have three black teeth in either jaw, the teeth and jaw are one peece, and of a bony substance. In the head is a manifest brain, or at least somewhat equivalent.

Some Grashoppers have not the long prick at the taile, but two tants above and two shorter underneath, and some have stumps instead of wings, but howsoever they variously differ in their externals, yet in all that I have dissected are alike, the vitals indeed, and

other particulars, are not so visible in the smaller, as in the greater.

Grashoppers copulate after the manner of other Insects, the less ascending the greater; for the male is the lesser. They disclose their eggs on the earth, fastening a pipe which they have at their tail to it. The males have none: All lay their eggs together in one place, so that they make a kinde of combe, but not on the superficies of the earth, but a little underneath, then the form of them as they were first produced, being changed out of that earthy cover, appear little and black Grashoppers, and after the skin being broken on every side, they become greater, they bring forth their eggs in Autumn, and presently being delivered of them perish, for there breed certain worms about their necks which strangles them saith *Pliny*, which eat through them, saith *Scaliger*, and the males also dye; they are quickned, and come from under the earth in the Spring.

Arist. de hist. Animal. l. 5. c. 23.

Grashoppers breed not much on mountainous, or squallid moist lands, but in Champion grounds which are apt to chap, for they lay their eggs in the chaps and cranies, out of which, Winter being past, in the beginning of the Summer following, of such eggs as are alive, come the Locusts or Grashoppers.

Fr. Valeriola.

They copulate thus, the male ascending the female, puts in those two tants or pricks that are eminent in the end of the back, by turning back of the tail into the females womb, and they are very long and closely joyned together, that they can scarce bee severed, neither yet by leaping or motion, no nor yet without difficulty with your hands.

The female in her venery, moves her belly earnestly, and closeth in the lower part to the male, and holds him very long, sometimes with the opening of her womb, sometimes with a strait shutting of it, making her dalliance more delightful; for while her womb opens, the male more deeply insinuates himself to the bottome of it, and when it is contracted, is more delighted with the pleasure of it.

There are seen two passages in the females privity severed each from other, and covered with a thick coat, it is black on the out-side, and hard and cartilaginous, but within seems somewhat rough and scabrous, with certain wrinkles. At the bot-

bottome of this covering, the womb growing white, is like a womans privy parts. The male after copulation dyes; For by a long continued use of venery, they spend all their radical moysture and spirits also. The females after they have brought forth either by the violence of the pain, or multitude of their young, whereby their strength is consumed, perish likewise; or as *Aristotle* by little Lice which breed in their necks, and as *Pliny* saith, strangle them, as *Scaliger*, eat into them and kill them.

They flye over large Seas, continuing divers dayes together in their flight, and make such a noise with their wings, that they seem to bee Fowls, and shadow the very Sun.

They infest *Italy* oftentimes out of *Africa*, consuming all with their bitings, and with their black, sharp, and burning excrements, and with a sharp slaver, which they in eating let fall out of their mouths, yet are they not poyson, for both the *Parthians* and *Ethiopians* feed of them.

Willichius assigns them a King, and a Monarchy, but *Solomon* denies it, saying, *That they have no King, yet go they forth all by bands*, but though they bee *sine rege & lege*, yet have they a conspiring agreement to do mischief. Proverb. 30, 27

When they wasted *Gaul* 852. they marched in the aire twenty miles a day in an ordered battel, and formed squadrons, and when they fell on the earth they had their camp; the Commanders with a few went before the Army a dayes journy, as it were to finde out fit places to quarter in, and the very same hour that the fore-runners or harbingers came the day before, the whole Troups came the day after; before the rising of the Sun they stirred not from the place where they settled, but the Sun being risen, they marched, or flew away in their orderly Regiments.

Cuspinian observes the same, in the same Country, in the year 874. but with this difference, that they marched then but four or five miles a day. Cuspinianus

Of Locusts there are sometimes seen such monstrous swarms in *Africa*, that in flying they intercept the Sun beams like a thick cloud. They devoure trees, leaves, fruits, and all green things growing out of the earth. I. Leo hist. of Africa l. 9.

At their departure they leave eggs behinde them, whereof

other young Locuſts are bred, which in the places where they are left, will eat, and conſume all things, even to the very bark of trees.

Scaliger exercitat. 192.

Their coming is known by the diſcolouring of the fields long before, for they ſhine by reflexion.

Julius Obſequens.

Before the birth of Chriſt, about a 170. years, the Paſtures of *Italy*, were covered as it were with clouds of Graſhoppers, and about *Capua* a hundred years together.

Paulus Oroſius contra paganos, l. 5. c. 11.

In the Conſulſhip of *Marcus Plautius Hypſæus*, and *Marcus Fulvius Flaccus*, *Africa* ſcarce breathing from bloody wars, an horrible and extraordinary deſtruction enſued. For whereas now throughout all *Africa*, infinite multitudes of Locuſts were gathered together, and had not onely quite devoured the corn on the ground, and conſumed the herbs with part of their roots, and the leaves, and tender boughs of the trees, but had gnawn alſo the bitter bark, and dry wood, being with a violent and ſudden winde hoiſted aloft in mighty ſwarms, and carried along time in the aire, they were at length drowned in the *African* Ocean. Whoſe loathſome and putrified carkaſſes being by the waves of the Sea caſt up in huge heaps far and wide along the ſhore, bred an incredible ſtinking and infectious ſmell: whereupon followed ſo general a peſtilence of all living creatures that the corrupt bodies of fowls, cattel, and wilde beaſts diſſolved by the contagion of the aire, augmented the fury of the plague. But how great and extraordinary a death of men there was, I cannot but tremble to report: For in *Numidia* where *Aliciſſa* was then King, dyed fourſcore thouſand perſons (in the Kingdom of *Maſſiniſſa* according to *Eutropius*, if I miſtake not, eight hundred thouſand.) And upon the Sea-coaſt next adjoyning to *Carthage* and *Utica*, above two hundred thouſand are ſaid to have periſhed. Yea in the City of *Utica* it ſelf were by this means ſwept from the face of the earth thirty thouſand brave ſouldiers, which were appointed to bee the Garriſon for all *Africa*. And the deſtruction was ſo ſudden and violent, that out of one gate of *Utica*, in one and the ſame day, were carried above fifteeen hundred dead corpſes, of thoſe luſty young gallants.

Georgius Cedrenus hiſt. Compend.

In the Reign of *Baſilius* the Emperor, the Eaſtern parts were conſumed by Graſhoppers, that the inhabitants were forced

to

to ſell their children, and at laſt to paſs into *Thrace*. But afterwards a vehement winde carried them into the *Helleſpont*, where they were drowned and caſt up on the ſands which they covered, and prodigiouſly lived again of themſelves, and waſted all the Countries adjoyning, and *Thrace*, eſpecially three years together.

In *May* 1350. an innumerable multitude of Graſhoppers of an unwonted greatneſs, and uncertain original, appeared in the Province of *Catana* in *Sicilia*, which conſumed Corn, Vineyards, Woods, Gardens, and Trees, both domeſtick and wilde, and conſumed their barks to the very roots every where in one day, and then by a ſudden wind were carried into the *Jonian* Sea, and there drowned; but being after caſt upon the *Sicilian* ſhore, cauſed by their ſtink a cruell plague in *July* following. Fazellus de rebus ſiculis.

Swarms of Graſhoppers came out of *Africa* into *Italy*, and alſo into *France* 1353. and alſo 1374. cauſing ſuch a famine and plague, that the third part of the people periſhed, and they had moſt of them ſix wings, and at laſt were hurried with a violent winde into the Britiſh Ocean. Otho Friſingenſis.

About *Miſnia*, 1543. there were ſo many Graſhoppers that they covered the ground about a cubit thick. Jacobus Ekeliius.

In all the Dominions of *Prete Janni* is a very great and horrible Plague, which is an innumerable company of Locuſts, which eate and conſume all the Corn and Trees, and the number of theſe Creatures is ſo great, as it is incredible, and with their multitude they cover the earth, and fill the air in ſuch wiſe that it is a hard matter to be able to ſee the Sun; and if the damage which they doe were general through all the Provinces of *Prete Janni*, they would periſh with Famine, and it were impoſſible to inhabite the ſame, but one year they deſtroy one Province; ſometimes in two or three of theſe Provinces, and whereſoever they go, the Country remaineth more ruinate and deſtroyed, than if it had been ſet on fire. Fran. Aluarez Ethiop. Hiſt. cap. 32. & 33.

Theſe Vermine are as great as a great Graſhopper, and have yellow wings, we know of their coming a day before, not becauſe we ſee them, but we know it by the Sun, which ſheweth his beams of a yellow colour, which is a ſigne that they draw near the Country, and the ground becoming yellow, through

through the light which reverberateth from their wings, whereupon the people become suddenly as dead men, saying, we are undone, for the Locusts come.

During our abode in the Towne of *Barua*, we saw the signe of the Sun, and the shadow of the earth, which was all yellow, whereat the people were half dead for sorrow; the next day, the number of these Vermine which came was incredible, covering four and twenty miles in compass.

At another time we travelled five daies journey, through places wholly wast and destroyed, wherein Millet had been sowne, which had stalks as great as those which we set in our Vineyards, and we saw them all broken and beaten downe, as if a Tempest had been there, and this the Locusts did; the trees were without leaves, and the barks of them were all devoured, and no grass was there to bee seen, for they had eaten up all things, and if we had not carried Victuals with us, we and our cattel had perished.

This Country was all covered with Locusts without wings, and they told us, that those were the seed of them which had eaten up all, and that as soon as their wings were growne, they would seek after the old ones, and the number of them was infinite.

While we abode in a place called *Aquate*, at another time came such an infinite swarme of Locusts, as it is incredible to declare, they began to come about three of the clock in the afternoon, and ceased not till night, and as they came they lighted, and the next day in the morning they began to depart, so that by nine of the clock there was not one of them left, and the trees remained without leaves.

The same day and hour there came another squadron of them, and these left neither bough nor tree unpilled, and so they continued for the space of five daies, and they said they were young ones which went to seek the old ones, and they did the like, where wee saw them that were without wings, and the compass which these Locusts took, was nine miles, wherein was neither leaves, nor barks on the trees.

This Country seemed not to bee burnt up, but rather to bee covered with snow, by reason of the whiteness of the trees, which were all pilled, so that all the Country remained bare.

At such times the people depart from their own Country, so that

that wee have found all the wayes full of men and women, travelling on foot with their children in their arms, and upon their heads, going into other Countries, where they might finde food, which was a pitiful thing to behold.

Ouce, *Eutropius* makes mention of great Locusts, which were seen not far from the *Roman* Territory, so formidable, and such devourers, that the inhabitants were frighted with the beholding of them, so that wee must conclude that these small creatures have a chief place among Gods Troops and Armies. If *Pharaoh* ask, *Who is the Lord?* Not Angels, not Men, nor yet fierce Lions, and Tygers, but devouring Grashoppers shall bee his challengers and conquerors, and ask, *Who is Pharaoh?* Eutropius l. 4.

They are all females if wee beleeve *Vincentius*, and *Alberius* as the *Scarabees* all males. Great droughts produce them; at least cause a prodigious increase of them, 1553. after five years drought, were great Armies of them; And *Paulus Diaconus* reports that in the tenth year of *Mauritius* the Emperour after a great drought from *January* to *September*, there were infinite multitudes of Locusts, which two years caused a great famine in *Italy*, by consuming corn and fruits, and 1542. an innumerable multitude of Locusts over-spread a great part of *Europe*, at first they wanted wings (being it seems produced by the drought) after they had two, and then four, and having wasted one place, went unto another, leaving a terrible stink after them whersoever they had been, but at last with Autumns cold were destroyed. Vincentius. Cornelius Gemma.

Their extraordinary appearance is (accounted by some) a sign of an approaching plague, sometimes of war, for it is reported, that two Armies passing by *Clermont* into the *Romanick* Territory (a place in *France*) there fought together, where many of of them were killed; when *Clotarius* was about to fight with his son *Chrannus*, whom overcoming, hee caused to be burnt with his wife and children. Hieron. Mercurialis. Georgius Turonensis.

These eaters are usually eaten by the inhabitants of *Arabia deserta*, and of *Lybia*, who esteem their coming as a fortunate boading, for seething and drying them in the Sun, they bruise them to powder, and so eat them. Jo. Leo lib. 9.

And they were the food of *John Baptist* in the Desart, yet there have been some, as *Theophylact* testifies, who understood

Theophilact. by ἀκρίδας, the buds or tops of certain herbs, or some kinde of wilde fruits, in which number was *Hermolaus Barbarus*, who saith *Chrysostome*, and *Athanasius* before him, were of the same judgement; but *Chrysostome* denies it, and saith a Locust is a small creature, between a flying, and a creeping; of which in the Desarts of *Judea* were great store, they were wont to boyle them in oyle, and they were the food of the poorer sort.

Hom. 2 in Marc.

Augustin in Epist. ad Rom. *Augustine* confirms it also, that *John* fed of Locusts. And *Theopilact* witnesseth the same; who doth also interpret the eating of Locusts allegorically, as also *Origen*.

Adamant. Origines, Diodorus, Siculus lib. 3. c. 3. Strabo. Geoprax. l. 16. Solinus poly hist. c. 43. *Diodorus* saith that the *Acridofagi*, or the *Ethiopians* bordering on the Desart that feed on Grashoppers, are of lower stature than other men, lean, and exceeding black; So also *Strabo*, and adds they are of a very short life, seldome exceeding forty.

And *Solinus* also takes notice that the borderers on *Mauritania* in a certain season (the Spring) gather great quantities of Locusts which they salt, and live hereof all the year, but none out-live forty years.

Scaliger exercitat 192. The *Parthians* of old fed of them, as *Pliny* reports. And *Scaliger* saith, the *Sirians* and *Persians* eat them before they have wings, namely the young ones.

Hieron. Mercurialis lib. 2. var. lect. 20. It is to bee observed, that all Grashopper-eaters are of a short life: A learned Physitian enquiring what was the cause the people about the Red-sea are troubled with boyls on their legs and armes, demands if it bee from the aire, or the region, or their food, concludes peremptorily it was from their food. And

Diodorus l. 3. cap. 3. *Diodorus* affirms that certain people with frequent eating of Locusts, were not onely short lived, but much anguished, and at last consumed, not onely with boyls (mentioned before) but with a cruel kinde of winged lice, of which one gives a full relation.

Agatharsis. At the *Vernal equinox* when the South-west-winds blow from an uncertain place, an incredible number of great Locusts are brought, which in flying differ little from birds, but much in the shape of their bodies. With these Locusts salted and otherwayes prepared, the people live, they are excellent for footmanship, but feeding of so dry nourishment, they live not beyond the fortieth year, for then they dye, if not before, a miserable death, for a certain kinde of winged lice is bred in their bodies, like unto

Dogs

Dog-flyes, but somewhat less. They begin at the breast and belly, and in a short space eat off all the skin of the face. Some of them are like Lepers, and grievously scratch themselves, and the disease still continuing, and these vermine increasing, their humors are spent, and they extreamly tormented, till at length they bee killed and consumed by them.

CHAP. XXXII.

Of American Bees.

IN the West-Indies the Bees are small, about the bigness of Flies, or somewhat greater, and the points of their wings cut overthwart, and have through the middle of the wing, one white line across. They have no sting. Goncalo Fernandes de Oviedo natural y general istoria de la Indias, c. 30.

They make great Hony-combs, and the holes in them are four times greater than the cells of our *European* Bees, although they bee much smaller, their hony is good and wholesome, but it is very dark, like wine being boyled.

In the Island of *Cozumel*, which is near the coast of *Jucatan*, there are many Hives of Bees like those of *Spain*, but less, and much hony, and wax, the hony is like the *Spanish* hony, but somewhat sharper. Rhamusco vol. terzo delle Indie l. 17. c. 1.

In the Island of *Hispaniola* are no Bees, that ever I saw or heard of. In the firm land are very many, and of many kindes, as well as in the form and shape of the creature, as also in the variety of the taste and colour of the hony, and difference of the wax. Goncalo Fern. de Oviedo della generale & naturale historia della India l. 15. c. 3. apud Rhamus. 3. vol. Purchas Pilg. 3 part l. 5 c. 3.

But though *Oviedo* neither saw nor heard of any, yet are there Bees in *Hispaniola*, but as small as Flies, which sting not; their hives are four times as great as ours, their hony is white.

In the *Indies* are few swarms of Bees (hee understands domestick Bees, which then were rare, but now in many places common. Jo. Acost. l. 4. c. 34.

Their Hony-combes are found in trees, or under the ground, and not in Hives as in *Castile*. The Hony-combes, which I have seen in the Province of *Charcas*, which they call *Chiguanas* are of a gray colour, and have little juice, and are more like unto

ſweet ſtraw, then to Hony-combes. The Bees are little like, unto Flyes, the hony is ſharp and black, yet in ſome places there is better, and the combs better faſhioned, as in the Province of *Tucuman* in *Chille*, and in *Carthagene*.

Cronica del Peru per Pedro de Cieca, c. 25

In *Peru*, eſpecially about the City *Cartago*, are many Bees, which breed in hollow Trees, and make as good Hony as the Bees in *Spaine*; there is one ſort of Bees not much greater than Gnats, theſe ſtop up the hole, or paſſage into the cavity of the tree, and by a pipe of waxe as great as the middle finger, goe in and out to their labours, their Hony is thin and ſomewhat ſharp, they get uſually about a quart of hony out of a tree.

There is another ſort of Bees which are ſomewhat greater, and black (for the former are white) the entrance into the tree where they work is made up (except a paſſage for them) with waxe, and ſome other mixture, whereby it is harder than a ſtone, their hony is without compariſon better than the former, and a Tree will afford uſually a gallon, and ſometimes more.

There is another ſort of Bees which are greater than the *Spaniſh* Bees, but none of them ſting, but when they finde that any goe about to plunder them, they will charge upon him that cuts the tree, and hang about his hair and beard; theſe greater Bees yeeld uſually three gallons out of a tree, and it is farre better hony than any of the former.

Ant. D' Herrera Hiſtoria general de los hechos, &c decad. 5. lib. 10, c. 10.

In the Province of *Guayaquil*, which is not farre from *Quito*, they breed in Trees, and are not much greater than Flies, the Waxe and the Hony which they gather is red, and although it hath a good taſte, yet is it not like to the Hony of *Caſtile*.

Maximil. Tranſilvanus in Epiſt. ad Epiſcop. ſaliſburg.

Near the Rivers of *Vaſſes* and *Plate*, the Bees are not like ours, being not greater than the ſmall Flies wherewith wee are troubled in Summer; they work in Trees, and make larger combes than ours, the extremities of their wings are blunt, as if they were cut (*Oviedo* and *Thevet* confirm it) or bitten off, and have in the middle of them a croſs ſpot drawing towards white, without ſtings, their wax is as black as pitch. The hony generally of the Bees, of the new world, candies not, but is alwayes liquid like oyl.

Huldrichus Smidel.

The Country of *Mackaſies* 372. *Germane* miles from the City of *Aſſumption* in the River of *Plate* (near *Peru*) is ſo abundant

abundant in Bees, that you shall scarce open any tree with a hatchet, where will not run out five or six measures of pure hony; the Bees that make it are very little, and without stings.

Aldrovandus citing *Hispanus* saith, that in the Isle of *Cumana*, the swarms hang on the Trees, and flow down with hony. Petrus Hispanus.

In *Tymona*, not far from *Quito*, the *Indians* make many conserves of hony, which is somewhat plentifull with them, and send them to sell to the Countries round about them. A. d'Herrera de las Indias occid decad 6. l. 3. c. 16.

The *Indians* of *Cumana*, although their Country bee well replenished, with good bread, corn, fruits, and all kinde of fish in great abundance, yet eat Bees, Lice, Spiders, *&c.* Linicoten, l. 3.

The *Brasilian* Bees are very unlike to ours, and differ not much from the little black flesh Flye; which annoy us in Summer, and make their combs usually in hollow trees; they call the hony *Yra*, which they eat as wee do, their wax is as black as pitch, which they call *Yetic*, they use it not for candles, as wee do, but to stop their great Canes, wherein they keep their feathers that they bee not eaten by a kinde of Butter-flye, which they call *Araveri*. They come in multitudes to the fire, like Crickets, where they eat whatsoever they finde, especially they gnaw the upper part of leathern doublets, and shooes. If wee negligently reserved hens, or other food, in the morning, wee should have onely bones. Hist. Navigat. in Brasil. Lerius.

Several sorts of Bees in *Brasile*: Yeatee is the smallest of all the Bees that ever I have seen in the Country, and is in making much like a gnat, but of a yellowish colour, and hath commonly her hony in the hollow of a tree, either at the root, or not above three or four foot from it; it stingeth not, and where they enter, they make a pipe of yellowish wax about four inches long, with the mouth of it, like to the mouth of a Trumpet, the combs are joyned together like clusters of Nuts, and their hony is an excellent balsome, for I have had experience of it my self for the curing of very dangerous green wounds. Mr. Joh. Stanes my friend, and neighbour who lived many years in Brasil.

Zellab, and *Zellobson* are the two chief sorts of Bees, and sting not at all; the lesser is so like our Bees here in *England*, that I think I should not know one from the other, the other is bigger, but yet much of the same colour; they have honey in abundance, and the further up into the Country the more plenty; I have

ſeen more taken out of a tree at a time than a Firkin will hold, as clear as running water, but if drunken, it is exceeding ſtrong, and cauſeth thirſt, it muſt bee taken very moderately. They build moſt commonly in ſome hollow bough of the tree, or elſe in the body of a tree, called by the *Indians Keranvah*, they have their hony in cluſters of balls, much like our Humble-Bees, and their young ones in combes which lye compaſſed with the balls of hony, and in the balls you ſhall find ſome hony as it is new brought in, very thick and dry, but taſte it, it is very ſoure, and ſo ſome more near ripe, but not fit to eat, untill it come to be clear as water; you may ſee in the balls or cluſters, the colour of the bloſſome from whence it was gathered.

There are two other ſorts of Bees that are but ſmall, and of a black colour, one ſort ſtingeth not, but the other doth; they are very like each to other, and build about the middle of the tree, the hony of them both is much alike, but not ſo good as the former, being of a darker colour, and their combes are in manner with the former, and they are called *Erete.*

There are other ſorts of black Bees called *Erepnoh* and *Erepnohaſon*, they both ſting, and intangle much in a mans hair, the one buildeth in the hollow of a tree, and the other in the branches, that which buildeth in the hollow of a tree, will not ſuffer any man to come within two or three rods of the tree where they are.

I never ſaw any of their hony, but the natives have told me, that they have indifferent ſtore, but it is very laxative, and breedeth diſeaſes in the eater, as bloody flixes, *&c.* the other buildeth in the branches, and make their houſe of dirt, bigger than one of our large Bee-hives, and enter at the middle of it, their young are as it were, in little cells or chambers, and from thence between ſeveral layings of dirt, they have their hony, which is not very much, but is binding.

There is another ſmall ſort of Bees, and they either build in fields, where there are but ſmall ſtore of trees, and they low ones; they are of an aſhy colour, and build in the branches like *Erepnohs*, but their neſt is like a film, or skin, and of the colour of the Bee, they have not much hony, and have a thin flat combe, or elſe they build among the Tobacoes, and from thence they take their name, being called *Tobacava.*

In

In *Hispaniola* their Wasps are greater than ours, and sting more dangerously. There are many of them, and they very poysonfull, they cause great pain when they sting, they are like those of *Castile*, but somewhat greater, and under their wings above the yellow towards the end, have a little Lion-like colour. More fully in another place, hee saith, There are many Wasps in the West-Indies. They are very hurtfull and venemous, and their stinging is without comparison, more painfull than the stinging of *Spanish* Wasps, they are almost of the same colour, but greater, and the yellow of them is more red, and their wings are spotted with a black colour, and the points of them reddish of a burnt colour. Purchas Pilg. 3. part. l. 5. c. 3. Oviedo l. 15. c. 3.

They make very great nests, and the clusters of their combs are as large as the combs that the Bees make in *Spain*, but they are dry and white inclining to russet, they have nothing in them but their young: They breed in trees, and also in the roofs and timbers of houses. Oviedo. Sumario de la natural y general istoria de las Indias c. 49.

There are many Hornets in *Hispaniola*, and their stinging more torments, than the stinging of their Wasps.

There are two sorts of Homets in *Brasile*, which the *Indians* call *Moribundas*, the one black, and the other much of the colour of them wee have here in *England*, but the black is bigger and longer, and stingeth violently. They make their house like a Canopy, or much like to the top of a Bee-hive, and they are fastened to a bough of a very high tree; so that they seldome offend any man, unless they first offend them; but your herdsmen are sometimes much vexed with them, in driving their cattel, they are unruly many times; they run among some Sippoes or Withes that run into the tree, whereby they disturb them, and then they come down to the terror of men and beasts. Their house is open below, so that you may stand under them, and see them go into a comb that lyeth flat at the bottome, much like to our Hony-comb. Rhamusio l. 3. c. 3. torzo Vol. Mr. John Stanes.

FINIS.

Books lately Printed for *Thomas Parkhurſt*, at the Sign of the Three Crowns, over againſt the Great Conduit, at the lower end of Cheapſide.

A Learned Commentary, or Expoſition upon the firſt Chapter of the ſecond Epiſtle to the *Corinthians*, by Dr. *Richard Sibbs*, publiſhed for publick good by *Thomas Manton*, Folio.

There is newly come forth Mr. *William Fenner* his Continuation of Chriſts Alarm to Drowſie Saints, with a Treatiſe of Effectual Calling: The Killing Power of the Law: The Spiritual Watch: New Birth: A Chriſtians ingrafting into Chriſt: A Treatiſe on the Sabbath, which were never before printed, bound in one Volume, *Fol.* and may bee had alone of them that have his other Works, as well as bound with all his former Works, which are now newly Printed in the ſame Volume with this.

Truth brought to light, and diſcovered by time, or an Hiſtorical Narration of the firſt fourteen years of King *James*, in 4°.

The Journal or Diary of a thankful Chriſtian, wherein is contained Directions, for the right method of keeping and uſing, according to the Rules of Practiſe; a Day-book of National and publick, perſonal and private paſſages of Gods Providence, to help Chriſtians to thankfulneſs, and experience. By *John Beadle*, Miniſter of the Goſpel at *Barſtone* in *Eſſex*, large 8°.

Mr. *Robinſons* Chriſtians Armor in large 8°.

Book of Emblems, with Latine and Engliſh verſes made upon (*Lights*) by *Robert Farly*, ſmall 8°.

Grace to the Humble, as preparation to the Sacrament in five Sermons by Dr. *John Preſton*.

Picturæ Louvenſes, or Pictures drawn forth into Characters, 12°.

A moſt Excellent Treatiſe containing the way to ſeek Hea-

vens Glory, to flye Earths vanity, to fear Hells horror, with godly Prayers, and the Bell-mans ſummons, 12°.

Johnſons Eſſayes expreſſed in ſundry Exquiſite Fancies.

The one thing neceſſary; By Mr. *Thomas Watſon*, Miniſter of *Stephens Walbrook*, 8°.

Sion in the Houſe of Mourning, becauſe of Sin and Suffering, being an Expoſition on the fifth Chapter of the *Lamentations*, by D.S. Paſtor of *Upingham*, in the County of *Rutland*.

Groans of the Spirit, or the Trial of the Truth of Prayer.

A Handkercher for Parents Wet-eyes, upon the death of their children or friends.

The Dead Saint ſpeaking to Saints and Sinners living, in ſeveral Treatiſes, *viz.* On 2 *Sam.* 24. 10. On *Cant.* 4. 9 On *John* 7. 15. On *John* 1. 50. On *Iſa.* 58. 2. On *Exod.* 15. 11. Never publiſhed before. By *Samuel Bolton*, D.D. late Maſter of *Chriſts Colledge* in *Cambridge*.

Four profitable Treatiſes very uſefull for Chriſtian practice, *viz.* The Killing Power of the Law: The Spiritual Watch: The New Birth: Of the Sabbath. By the Reverend *William Fenner*, late Miniſter of *Rochford* in *Eſſex*.

Peoples Need of a Living Paſtor, at the Funeral of Mr. *John Froſt*, M.A. by Mr. *Zach. Croſton*.

A Treatiſe againſt the Toleration of all Religions. By Mr. *Thomas Edwards*.

Chatechizing Gods Ordinance in ſundry Sermons, by Mr. *Zachary Croſton*, Miniſter of *Buttolphs Aldgate London*, the ſecond Edition corrected and augmented.

A Coppy-Book methodized and ingraven, by *Thomas Croſſe*, wherein fair Writing is expreſt, by which one may learn to write of himſelf, that can but read.

Dr. *Stoughtons* thirteen Sermons containing the form of Sound words, and ſome other Treatiſes.

The Godly Mans Ark, or City of Refuge, in the day of his Diſtreſs, diſcovered in divers Sermons, the firſt of which was preached at the Funeral of Mrs. *Elizabeth Moore*. Whereunto is annexed Mrs. *Elizabeth Moores* Evidences for Heaven, compoſed and collected by her in the time of her health,

for her comfort in the time of ſickneſs; By *Ed. Calamy*, B. D. and Paſtor of the Church at *Aldermanbury*.

Enchiridion Judicum, or *Jehoſaphats* Charge to his Judges, opened in a Sermon before the Right Honourable the Judges, and the Right Worſhipful, the Sheriffe of the County Palatine of *Lancaſter*.

Together with *Cataſtrophe Magnatum*, or King *Davids* Lamentation, at Prince *Abners* Incineration. In a Sermon meditated on the Fall, and preached at the Funeral of the Right Worſhipful *John Atherton* of *Atherton*, Eſq; High-Sheriffe of the County Palatine of *Lancaſter*. By *John Liveſey* Miniſter of the Goſpel at *Atherton*.

There are going to the Preſs ſome new Peeces of Mr. *William Fenners*, late of *Rotchford* in *Eſſex*, never yet printed, preſerved by a ſpecial Providence, one of which is a Second Part of his Wilful Impenitency; being five Sermons more that he preached upon the 18. of *Ezekiel*, and the 32. verſe.

FINIS.